

## CHAPTER 9: TOURISM

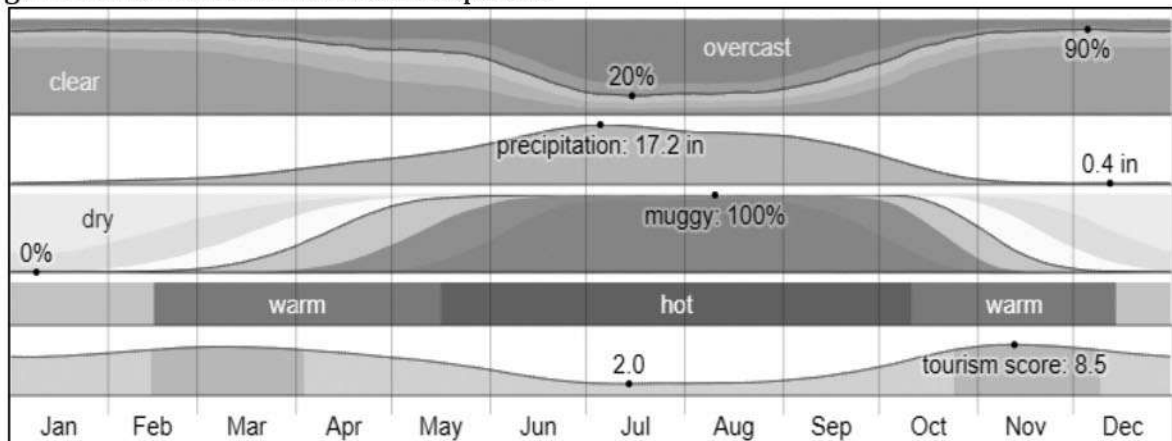
### 9.1. Introduction

Tourist spots are one of the major reasons that enhance the beauty of the place and attract the attention of the people. Tourism in India serves as one of the largest service industries that contributes about 6.23 percent of the nation's GDP and provides 8.78 percent of the total employment. Silapathar is blessed with its lush greenery surrounding the town and the foothills of its neighbouring state Arunachal Pradesh adding up to the scenic beauty of the place. Silapathar has small tributary rivers flowing down from Arunachal Pradesh which serves as good spot for leisure hangouts spots and sightseeing. This chapter will highlight some of the best tourist spots here in Silapathar in detail.

### 9.2. Tourism near Silapathar

Silapathar town being an upcoming commercial town packed with services and commercial outlets, has nothing much to provide within the town but, the town is surrounded by some great tourist and picnic spots within the range of 15 km which are easily accessible by road (See Figure 9.2).

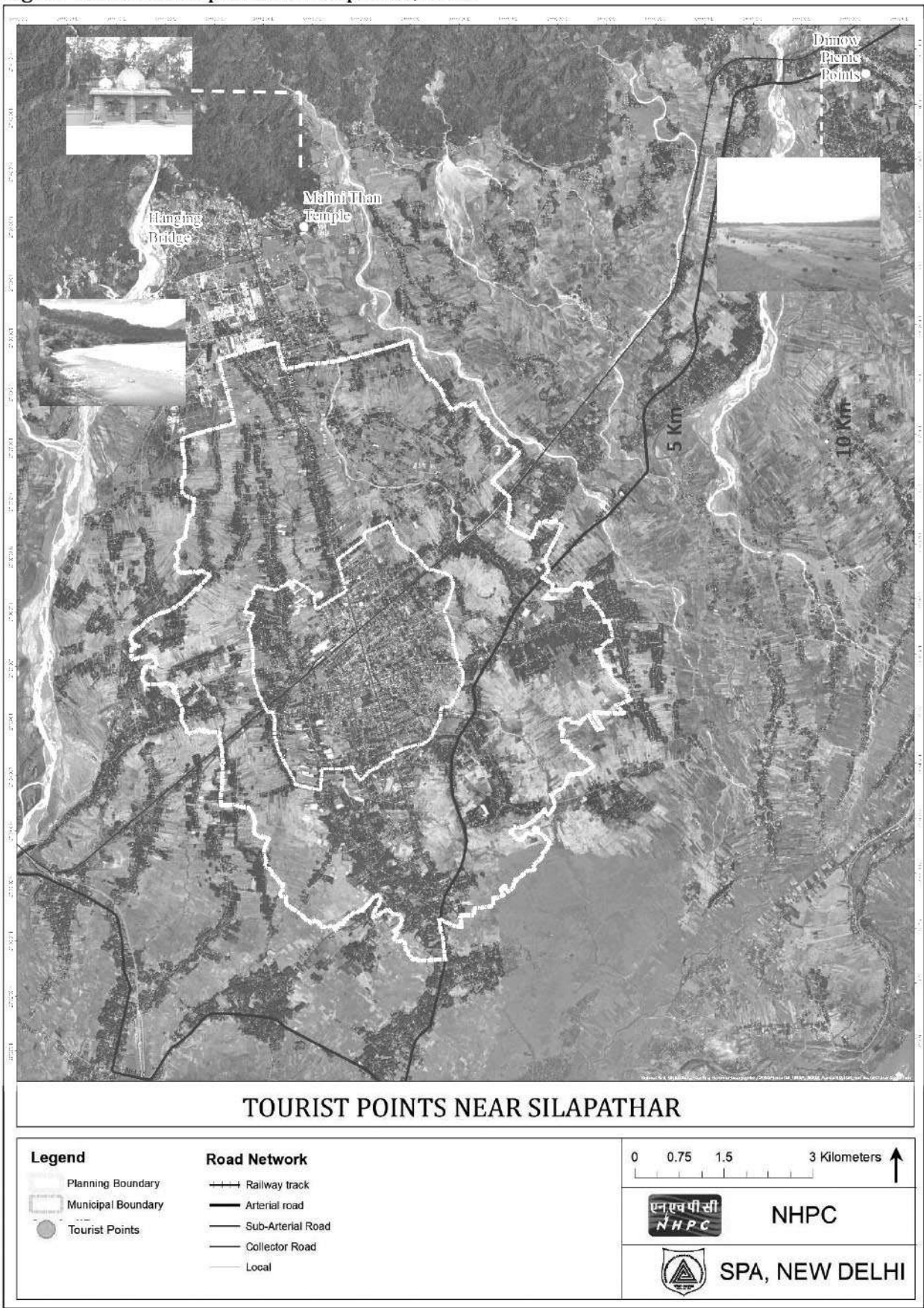
Figure 9.1: Climate Forecast for Silapathar



Source: weatherspark.com (2022).

Based on the tourism score (See Figure 9.1), in Shilapathar, the dry season is pleasant and mainly clear whereas the wet season is mostly cloudy and unbearably hot. The average annual temperature fluctuates between 51°F and 87°F, rarely falling below 48°F or rising over 93°F. The best times of year to visit Shilapathar for warm-weather activities are from mid-February to early April and from late October to early December.

Figure 9.2: Tourist Spots near Silapathar, 2022



Source: SPA, New Delhi (2022).

### 9.2.1. Malini Than Temple

The Malini Than temple, an archaeological site located in the foothills of Siang Hills, in the border of Arunachal Pradesh is just 8 kms away from the Silapathar town. The Malini temple consists of ruins of Hindu temples of the early medieval period which were made of granite stones during the period of Hinduism influence in the region. The Malini temple dedicated to Goddess Durga is constructed in the classical tradition of Orissa and displays highly decorated sculptures, carved columns and panels and detailed icons of Deities which have been excavated from the spots resembling high importance of historical preservation (See Figure 9.3).

Figure 9.3: Malini Than Temple Views 2022



Source: SPA, New Delhi (2022).

The Temple is well-lit with decorative colour lights, which becomes a sight to see in the evening and is also open to tourist every day. The temple holds great importance to both locals and outsiders and is one of the most attractive spots in the region.

### 9.2.2. Dimow Picnic Spots

Dimow is a small village in the Sisiborgaon revenue circle which is about 18 kms away from the town of Silapathar. The village of Dimow lies next to Tributary River flowing down from the foothills of Arunachal Pradesh giving it one of the best scenic views the place has to offer. Located in a flat terrain, Dimow has become a frequent spot for picnic lovers and spot for seeing the sunset view. The destination to the picnic spot is diverted away from the NH 515 and is accessible through local roads (See Figure 9.4).

Figure 9.4: Dimow Picnic Views, 2022



Source: SPA, New Delhi (2022).

### 9.2.3. Likabali Hanging Bridge

Likabali Hanging Bridge is another picnic destination spot which is located next to the Likabali Military Station which is about 10 km away from the town. Located next to the border of Arunachal Pradesh the spot is famous for its hanging bridge which attracts most of the locals and tourist. The mini suspension hanging bridge is used a connection for light goods transfer from Arunachal Pradesh to Likabali Assam (See Figure 9.5).

Figure 9.5: Likabali Hanging Bridge Views, 2022



Source: Google images (2022).

Small vending businesses are also done here, where they sell local products like local vegetables, local fishes and local rice beers which are a traditional wine made of fermented rice. The spot is open for the public and is a go to spots for most of the locals residing in the area.

### 9.3. Festivals

The state of Assam is very rich in its diversity and culture and celebrates a lot of festivals which characterise the spirit of unity and solidarity of its diverse ethnic group. The primary three festivals of Assam are the three Bihus, that are Bohaag Bihu (Mid-April), Maagh Bihu (Mid-January) and Kaati Bihu (Mid-October). Unlike any other places in Assam, Silapathar also celebrates these three auspicious Bihu celebrations with great joy and pride.



### 9.3.1. Bohaag Bihu

Bohaag Bihu is one of the most important and colourful Bihu among the three Bihu celebrated. Celebrated in the month of Mid-April it marks the New Year advent of spring and the beginning of the agriculture season. This Bihu extends over a week and includes exchanges of traditional hand woven Gamochas (scarves), singing and merry making accompanied by beats of local music, drums, and buffalo hornpipe (**See Figure 9.6**).

Figure 9.6: Bohaag Bihu traditional Dance Celebration



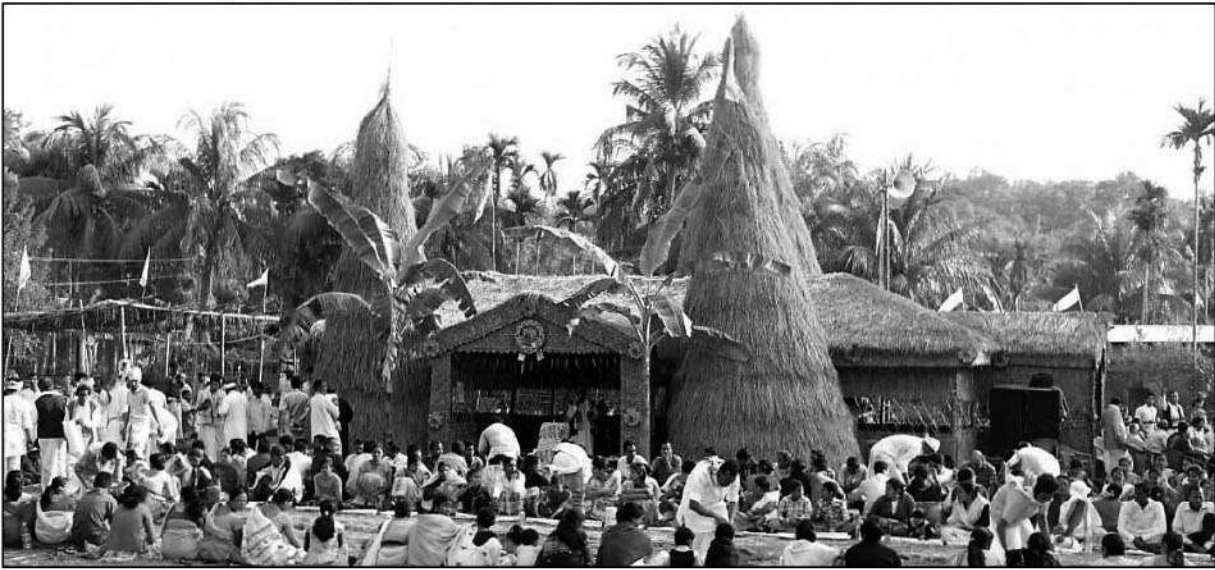
Source: Google images, (2022).

### 9.3.2. Maagh Bihu

Maagh Bihu marks the end of the harvesting period and is also known as Bhogaali Bihu or the festival of food. It is celebrated in the month of Mid- January during which the harvest is gathered marking the end of a successful harvest. During this festival locals and farmers build a temporary structure made of hay wood having a considerable height and make a bonfire and celebrate community feasting and celebrate the harvest (**See Figure 9.7**).

Figure 9.7: Maagh Bihu Celebration

Source: Google images, (2022).



#### 9.3.3. Kaati Bihu

Kaati Bihu also known as the Kongaali Bihu, or the festival of the poor is celebrated in the month of Mid-October that marks the completion of sowing and transplanting. During this festival people chant silent prayers and light earthen lamps in their paddy fields. Lamps are lit in the tip of bamboo poles and are believed that the souls of the dead are taken to heaven (See Figure 9.8).

Figure 9.8: Kaati Bihu Prayer



Source: Google images, (2022).

#### 9.4. Conclusions

Tourism sector in Silapathar has a lot of potential given the natural resources it already has. Located in the foothills of Arunachal Pradesh and surrounded by tributary rivers, the location of Silapathar gives the perfect blend of scenic beauty. The town of Silapathar which

is an upcoming commercial town, does not have any tourist or heritage spots within the city, but is surrounded by some beautiful heritage and picnic spots which are close by to the town area. The present picnic spots around the city are open picnic spots for which there is no maintenance so, proper planned picnic spots with proper dedicated area and proper amenities can be provided to maintain a well-established recognised picnic spot in the future. Road connectivity leading to the tourist spots should also be improved since it helps to facilitate the movement of the tourist inflow.

Given the potential of natural resources it already has, the town can develop tourist spots in the coming future since it is a growing commercial area which would attract many people. Studying and analysing the potential of the tourism sector the town can provide within the town and tourist spots nearby, a proper tourist circuit can be developed in the future which would help facilitate the inflow of tourists in the town and help generate revenue and employment to the people of Silapathar.

## **CHAPTER 10: GOVERNANCE**

### **10.1. Introduction**

Governance is the process of overseeing or governing the process of implementation of laws and acts, which is carried out by decentralizing the power to the ULB's and other participants by giving them the liberty to share their views and express their needs to shape public policy and provide public goods and services.

For effective management of cities, it requires multi-pronged partnerships and the involvement of many stakeholders where they involve elected municipal representatives and appointed officers and non-official, committees, employees and their trade unions, government departments, the private sector, NGOs, CBOs, SHGs, neighbourhood committees, the media, etc. The effectiveness of the municipal governance thus depends on the interconnections between various stakeholders to produce desired goals for citizens and the environment.

Governance is increasingly becoming multi-government and multi-sectoral to manage the demand of the public, therefore good governance requires quality of leadership, transparency, participation, responsiveness, accountability, equality, and inclusivity within the planning area.

### **10.2. Institutional framework**

Municipalities perform certain functions which are laid out in the local government legislation of a state government. State governments conform to the provisions of 73rd and 74th amendments to the Constitution of India by which urban and rural local governments were provided the constitutional status. for the proper functioning of the city. The Twelfth Schedule of the Constitution of India provides 18 obligatory functions through the 74th Constitutional Amendment Act operationalizing the Directive Principles of State Policy.

The Twelfth Schedule of the Constitution of India provides the following function to the municipalities:

- Regulation of land use and construction of land buildings.
- Urban planning including the town planning.
- Planning for economic and social development.

- Urban poverty alleviation.
- Water supply for domestic, industrial and commercial purposes.
- Fire services.
- Public health sanitation, conservancy and solid waste management.
- Slum improvement and up-gradation.
- Safeguarding the interests of the weaker sections of society, including the physically handicapped and mentally unsound.
- Urban forestry, protection of environment and promotion of ecological aspects.
- Construction of roads and bridges.
- Provision of urban amenities and facilities such as parks, gardens and playgrounds.
- Promotion of cultural, educational and aesthetic aspects.
- Burials and burials grounds, cremation and cremation grounds and electric crematoriums.
- Cattle ponds, prevention of cruelty to animals.
- Regulation of slaughterhouses and tanneries.
- Public amenities including street lighting, parking spaces, bus stops and public conveniences.
- Vital statistics including registration of births and deaths.

### 10.3. Basic organisational functions

Urban local bodies are specifically mandated to perform the following functions in the state of Assam:

- Giving licenses to hotels and restaurants formed according to the laws of the council and after verification of submitted application and other desired documents and fees, also handles verification of the issued licenses.
- Providing NOCs and Fire NOCs, provisional NOCs, permanent NOCs, and renewing the fire NOCs.
- Building plan approvals, land use changes, land subdivisions and reconstructions.
- Public health related works, cleaning of storm water drains, cleaning of dirty drains and streets, disposal of dead animals, catch the stray animals, vaccinating dogs.
- Transfer of ownership of land or building permissions on submission of papers and paying any remaining balance amount.
- Obtaining documents and maps on submission of applications.



- Providing lease certificates after submission of required documents and the remaining lease amount.
- Reservation of community centres on submission of an application and reservation on payment of charges in cheque.

#### 10.4. Silapathar Municipal Board

The Silapathar Municipal Board currently spreads over an area of 10.58sq km. The municipal board is divided into 10 wards and serves a total population of 33,352 as per 2022. The Silapathar Municipal Board is further divided into various departments or branches under the Executive Officer and is divided into the following branches:

- General Branch
- Tax Branch
- Account Branch
- Part of General Branch for Building and Trade Licenses
- Computer Branch
- Sanitary Branch

Table 10.1: Category Wise Employees, 2021

Category Wise Employees	Regular	Fixed pay	Master Roll
Executive Engineer	-	-	-
Assistant Executive Engineer	-	-	-
Assistant Engineer	0	1	0
Junior Engineer	1	0	0
Sectional Assistant/Moharrir	-	-	-
Head Assistant	1	-	-
Sr. Assistant	-	-	-
Jr. Assistant	1	1	0
Data Operator/Computer Operator	-	1	-
Accountant	-	-	-
Jr. Accounts Assistant	-	-	-
Cashier	-	-	-
Tax Daroga	1	-	-
Assistant Tax Daroga	-	0	-
Tax Collector	-	3	-
Sanitary Inspector	-	-	-
Peon	1	-	-
Chowikdar	-	-	-
Driver	-	2	-
Labour/ Safai Karmacharies	-	4	7

Category Wise Employees	Regular	Fixed pay	Master Roll
Plumber	-	-	-
Electrician	-	-	-
Helper	-	1	-
Others-I Grade -IV	-	1	-
<b>Total</b>	<b>5</b>	<b>15</b>	<b>8</b>

Source: Silapathar Municipal Board, (2021)

### 10.5. Municipal Finance

To carry out public services and maintenance of public amenities, the Silapathar Municipal Board is vested with various functions including municipal finance involving management of revenues and capital finances. Municipal finance is divided into receipts and expenditure. The receipts are further divided into revenue receipts where it generates its revenue from its own taxes and non-grants taxes and the capital receipts include revenues generated through sale of lands and government grants. Both forms of receipts are expended on capital and other expenditure.

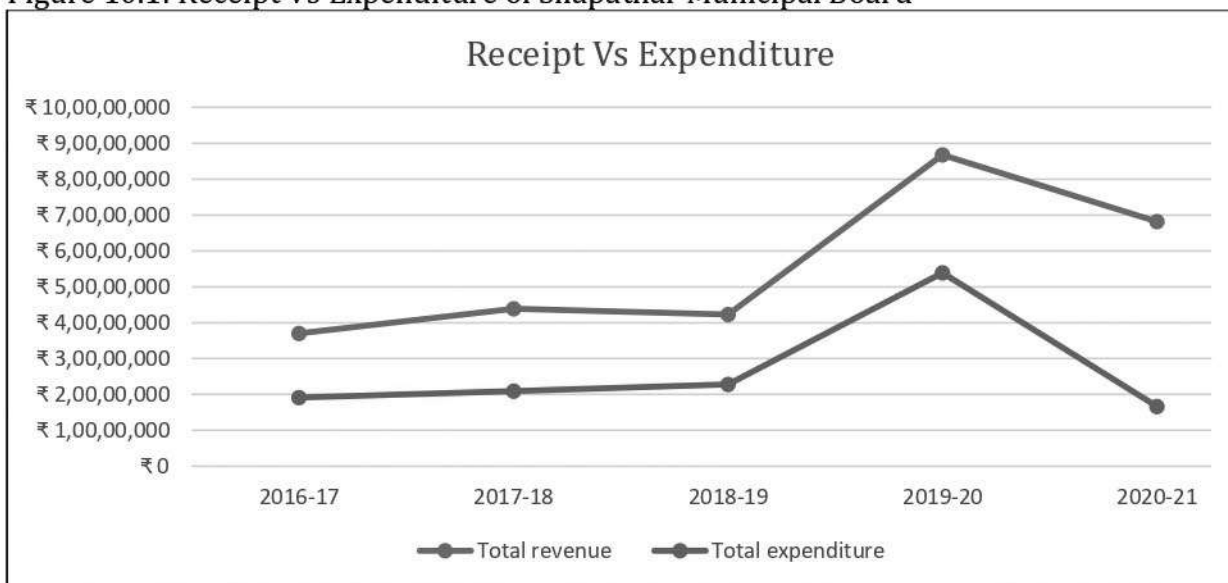
The Silapathar Board finance covers sources of revenue of the municipal government taxes (property, income, sales, and exercise taxes) user fees, and intergovernmental transfers. The Silapathar Municipal Board revenue mainly comprises of its own taxes and non-taxes along with the state government grants. The capital income comprises of revenue earned from the sale of land, general grants from state and central government, and various loans. **Table 10.2** shows the breakup of the total expenditure and receipts under various heads.

Table 10.2: Receipt and Expenditure of Silapathar Municipal Board in Rs.

Particulars	2016-17	2017-18	2018-19	2019-20	2020-21
Opening Balance	2,02,42,998	1,95,11,264	2,29,96,719	1,94,06,855	3,28,64,460
Total revenue	3,70,30,974	4,39,01,315	4,22,53,383	8,67,43,369	6,81,71,605
Total expenditure	1,91,23,250	2,09,04,596	2,28,46,528	5,38,78,909	1,66,74,786
Balance	3,70,30,974	2,29,96,719	1,94,06,855	3,28,64,460	5,14,96,819

Source: Silapathar Municipal Board (2016-2020)

Figure 10.1: Receipt Vs Expenditure of Silapathar Municipal Board



Source: Silapathar Municipal Board (2016-2020)

#### 10.5.1. Revenue receipt

##### (a) Own sources

The revenue receipts basically comprise of own taxes and non-tax revenues as well as grants from the state government. The Silapathar Municipal Board is vested with the power to levy taxes within limits of the municipality in the form of fees, tolls, and taxes or any of them under Section 68 of Assam Municipal Act, 1956 as follows

- A tax on holding situated within the municipality assessed on their annual value, payable by the owner.
- A water tax, payable by the owner or occupier on the annual value of holdings.
- A lighting tax, payable by the owner or occupier on the annual value of holdings.
- A latrine tax, payable by the owner or occupier on the annual value of holdings.
- A drainage tax, payable by the owner or occupier on the annual value of holdings, where a system of drainage has been introduced.
- A tax on private market payable by the owner.
- License fees on carts, carriages, and animals used for riding or burden.
- A fee on the registration of dogs and cattle.
- A fee on boats mooring within the municipality.
- Tolls on bridges.
- A betterment fee on holdings in area of which value has increased due to improvement schemes completed at Board's cost.

- Fees for setting up and maintenance of fire brigade.
- Fees for conducting at the cost of the Board any schemes of social service for the improvement of public health.
- With sanction of Government of Assam any other tax, toll, rate or fee

#### **(b) Nontax Source**

Non-tax sources like fees under municipal acts, fines, and other miscellaneous charges have a low contribution to the revenue income.

#### **(c) State government tax**

State government grants saw a steady decline in the financial year 2020-21. Devolution funds make up the majority share of the state government grants which form a part of the revenue receipts.

#### **10.5.2. Capital Receipts**

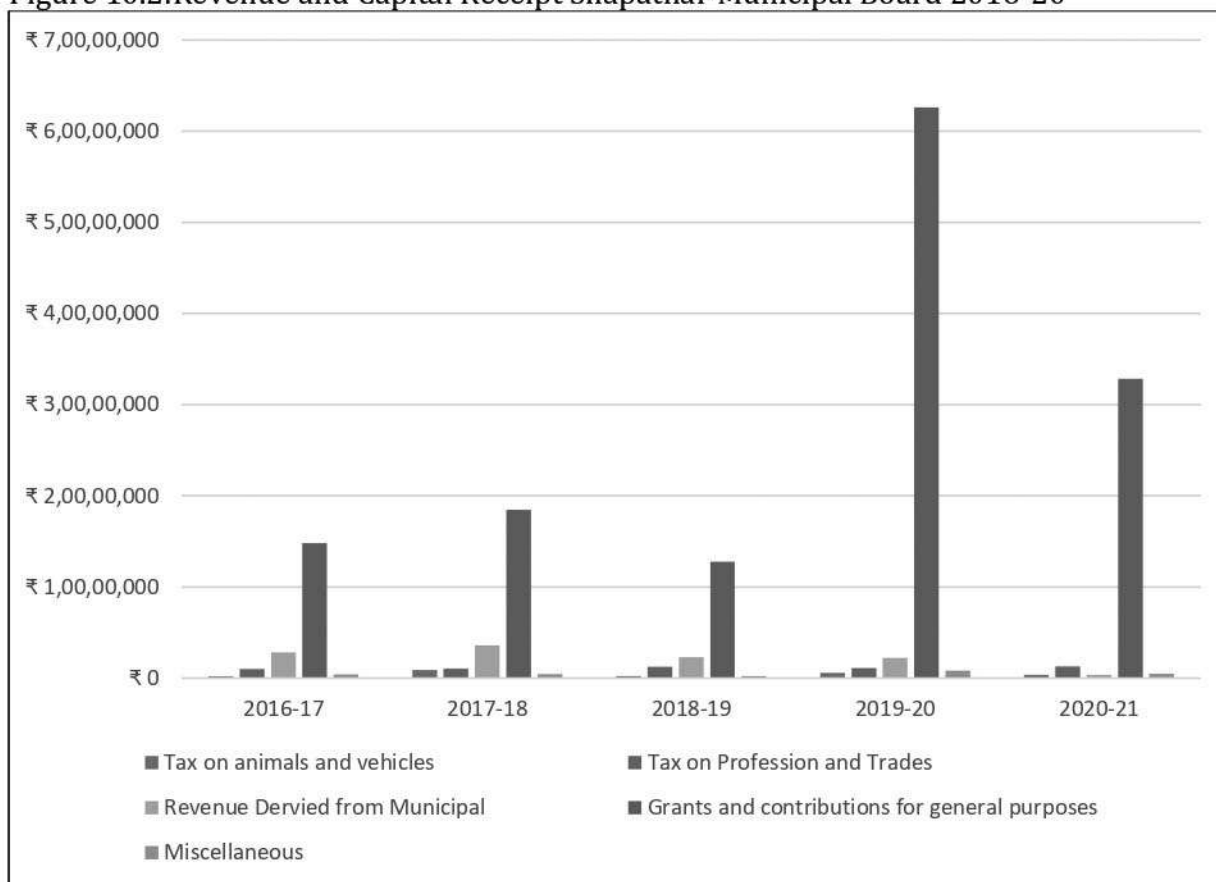
Capital receipts of Silapathar Municipal Board mainly comprise general grants by the central and state governments. Capital receipts have dominated the total receipts since the last 5 years.

**Table 10.3: Revenue and Capital receipt Silapathar Municipal Board 2016-20 in Rs.**

<b>Head of Receipt</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>2019-20</b>	<b>2020-21</b>
Tax on animals and vehicles	2,03,554	8,81,296	2,24,270	5,83,662	3,48,300
Tax on Profession and Trades	10,03,750	10,42,150	12,37,150	11,12,100	12,79,890
Revenue Derived from Municipal	28,41,730	35,91,382	23,09,077	22,19,600	3,50,000
Grants and contributions for general purposes	1,48,23,546	1,84,52,259	1,27,86,059	6,26,04,033	3,28,41,327
Miscellaneous	3,84,084	4,22,974	2,31,420	8,17,119	4,87,628

Source: Silapathar Municipal Board (2016-2020)

Figure 10.2: Revenue and Capital Receipt Silapathar Municipal Board 2016-20



Source: Silapathar Municipal Board 2016-20

The highest revenue receipt received were through Grants and contributions for general and special purposes. During the Financial year 2019-20 the municipal board received the highest grants from SFC and SOPD-ODS.

### 10.5.3. Revenue Expenditure

Revenue expenditure of Silapathar Municipal Board in general comprised of the expenditure on office establishment and salary, maintenance of public toilets and collection of taxes, books, etc. As seen in Figure 12.7 during 2019-20, highest expenditure was incurred on government funds and less emphasis was placed on public works, which indicates less development. (See **Table 10.4**)

Table 10.4: Revenue Expenditure of Silapathar Municipal Board in Rs.

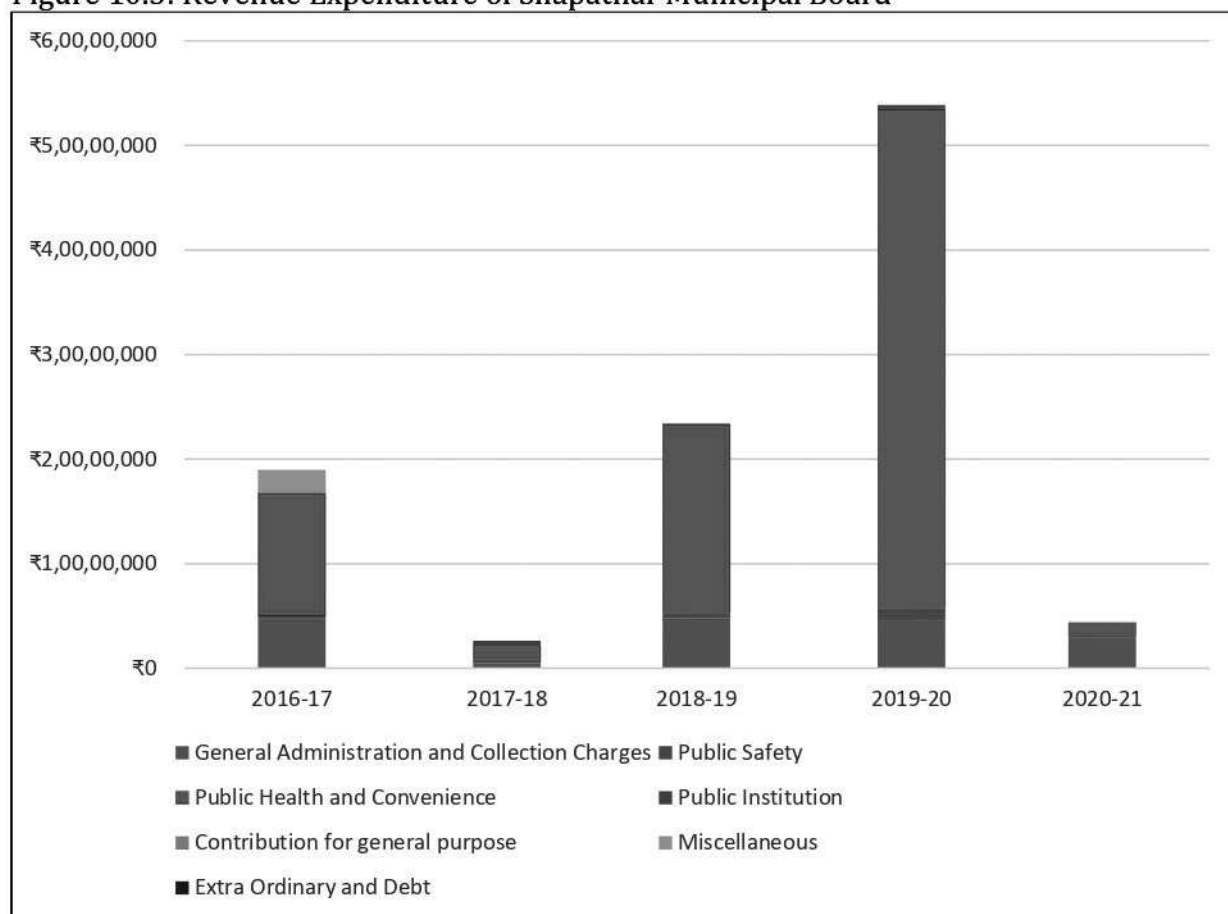
Head of Expenditure	2016-17	2017-18	2018-19	2019-20	2020-21
General Administration and Collection Charges	49,49,823	4,83,711	47,67,895	44,93,108	29,61,623
Public Safety	0	83,578	5,26,328	12,74,487	1,95,544
Public Health and Convenience	1,18,54,586	15,84,707	1,80,78,633	4,76,94,266	12,17,619
Public Institution	0	4,92,600	0	4,17,048	₹ 0



Head of Expenditure	2016-17	2017-18	2018-19	2019-20	2020-21
Contribution for general purpose	0	0	0	0	0
Miscellaneous	21,72,120	0	0	0	0
Extra Ordinary and Debt	0	0	0	0	0

Source: Silapathar Municipal Board (2016-2020)

Figure 10.3: Revenue Expenditure of Silapathar Municipal Board



Source: Silapathar Municipal Board (2016-2020)

#### 10.5.4. Capital Expenditure

The highest grants are received through government grants and expenditures are the highest in capital expenditure. In the financial year 2019-20, the Board received funds from central grant under the PMAY (U) for which expenditure were high during that year. Lack of proper data related to capital expenditure makes it difficult to conduct a proper analysis for the past years.

#### 10.5.5. Major Projects undertaken by the Municipal Board

- **15<sup>th</sup> Finance commission**

The Silapathar Municipal Board under the 15<sup>th</sup> Finance commission have undergone construction for roads and drainages and proposal for Solid waste treatment plant.

- **6<sup>th</sup> Finance Commission**

Plan and estimate for preparation of Solid waste management plan and land fill site development are under process under the 6<sup>th</sup> finance Commissions.

- **PMAY**

1st phase of the scheme has been completed and 2<sup>nd</sup> Detail project report for the 2<sup>nd</sup> phase is under process.

- **PM SVAnidhi**

Loan sanction have been approved for street vendors under this scheme for providing proper facilities to the street vendors.

- **AMRUT**

The Silapathar Municipal Board has prepared two plans i.e, the City water balance plan and City water action plan which have been uploaded to the official website for which funds are yet to be released for implementing water connection to households.

## 10.6. Conclusions

The Silapathar Board needs to strengthen its tax collection system to generate more revenue which will help boost the finance system of the municipal. Proper management and auditing of the budget should also be carried out on regular basis which will help ensure transparency and maintain a systematic accounting system. Introduction of Digital platform or E-governance can be implemented soon for redressal of public grievances in relation to municipal work.

## CHAPTER 11: LAND-USE

### 11.1. Introduction

A sustainable and effective Master Plan must include land use planning as a key component. Land use refers to the predominant use of lands such as residential, commercial, public semi-public areas, industrial, recreational, transportation, agricultural and eco-sensitive areas. In a Land Use Plan, different zones are defined for planning purposes. These zones delineate a single type of land use within the planning area based on the characteristics of that area. In this chapter, different types of land use will be discussed that exist in the Silapathar Planning Area based on the existing land use classifications of URDPFI standards for GIS Based Master Plans.

### 11.2. Planning Area

Planning Area refers to the area that lies enclosed within the municipal boundary along with the adjoining villages whose development will be closely linked to the future development of the municipal area. 43 such villages have been identified and included in the Planning Area for the Silapathar Master Plan, 2041. The area of these urban and rural regions has been given in **Table 11.1**.

Table 11.1: Delineation of Silapathar Planning Area, 2041

Sl.No.	Planning Area	Area (sq. km)
1.	Silapathar Municipal Area	10.57
2.	Adjoining Villages	42.80
3.	Silapathar Planning Area	53.37

Source: SPA, New Delhi (2022).

### 11.3. Existing Land Use Distribution

Within the municipal area, total developed area is 6.70 sq. km (63.33 percent) and undeveloped area is 3.87 sq. km (36.67 percent). In the planning area, the developed area constitutes 14.94 sq. km which makes up 28 percent of the total planning area. Nearly 38.43 sq. km (72 percent) of planning area is undeveloped land having only agriculture, water bodies, open areas and reserve forest as the predominant land use. The predominant

land use in the municipal area is residential which takes up 4.77 sq. km (45.12 percent). Agriculture is the predominant land use in the planning area where it takes up 28.2 sq. km which is nearly 52.84 percent of the planning area. This is followed by residential land use which constitutes 11.44 sq. km (21.43 percent) of the total planning area. Furthermore, in the planning area, open green spaces and grasslands take up 7.93 sq. km which constitutes 14.83 percent of the total planning area (see Table 11.2).

Table 11.2: Land Use of Silapathar, 2022

Sl.No.	Proposed Land Use	Municipal Area		Planning Area		Percent of Developed Area
		Area (Sq. Km)	Percent of Municipal Area	Area (Sq. Km)	Percent of Planning Area	
1	Residential	4.77	45.12	11.44	21.43	76.58
2	Commercial	0.37	3.50	0.43	0.81	2.88
3	Industry	0.02	0.23	0.02	0.04	0.13
4	Public & Semi-Public	0.43	4.03	0.55	1.03	3.68
5	Recreational/Play ground/Parks	0.07	0.67	0.08	0.15	0.53
6	Roads	0.96	9.09	2.35	4.4	15.73
7	Transportation	0.07	0.69	0.07	0.14	0.47
<b>Developed Area</b>		<b>6.70</b>	<b>63.33</b>	<b>14.94</b>	<b>28</b>	<b>100</b>
8	Agriculture	2.02	19.15	28.2	52.84	-
9	Water Body	0.19	1.83	0.66	1.23	-
10	Open Space/Grassland	1.66	15.69	7.93	14.83	-
11	Reserve Forest	0	0	1.64	3.1	-
<b>Undeveloped Area</b>		<b>3.87</b>	<b>36.67</b>	<b>38.43</b>	<b>72</b>	<b>-</b>
<b>Total</b>		<b>10.57</b>	<b>100</b>	<b>53.37</b>	<b>100</b>	<b>-</b>

Source: SPA Delhi (2022).

The total commercial area is 0.43 sq. km which is 0.81 percent of the planning area. In the municipal area, commercial area constitutes 0.37 sq. km which is 3.50 percent of the municipal area. Public Semi-public land use is 0.43 sq. km which is 4.03 percent of the total municipal area. In the planning area, Public and Semi-public land use takes up 0.55 sq km which is 1.03 percent of the planning area. Transportation land use is 0.07 sq. km which makes up 0.69 percent of total municipal area and 0.14 percent of the total planning area. Recreational/Playground/Parks within the municipal area take up 0.07 sq. km which is 0.65 percent of the municipal area and 0.15 percent of the planning area. Industrial land use within the municipal area covers 0.02 sq. km making up 0.23 percent of the municipal

area. In the planning area, Industrial land use covers 0.02 sq. km making up 0.04 percent of the planning area. Water bodies take up 0.66 sq. km which is 1.23 percent of total planning area (**see Table 11.2**).

#### 11.3.1. Residential

Residential land use refers to the areas where housing is the predominant use on land. This has been demarcated using the colour yellow on the land use map. This land use category includes all the plotted developments, group housing complexes, apartments, slum-squatters, colonies and rural settlements outside municipal boundary. In Silapathar town plotted housing is the most predominant type of residential land use. There are no slum settlements in the town. Detached houses can be found in urban as well as rural areas. Most of the housing in town can be found in the wards along Silapathar-Likabali Road, Lachit Borphukan Road and Jonai Road. Ward 2, Ward 3, Ward 4, Ward 6, Ward 7, Ward 9, Ward 10 and Ward 11 have denser built-up areas compared to the rest of the wards. Ward 6, Ward 9, and Ward 10 have the greatest number of pucca houses with 2 stories. Ward 7, Ward 8, Ward 9 and Ward 10 have a large number of Assam-type houses. Mixed-use residential areas can be found near Silapathar-Likabali Road, Lachit Borphukan Road and Jonai Road. As per the URDPFI guidelines, 45-50 percent of land area should be under residential land use for small towns. This needs to be considered while formulating the proposals for increasing the residential areas for the master plan. In the planning area, Lakhpathar Lakhipur, Akajan Miri Gaon, Memberchuk Gaon, Barati Gaon and Phulbari Nepali Gaon have much more residential area have much more residential settlements as compared to rest of the villages in the planning area.

#### 11.3.2. Commercial

Commercial land use refers to the use of land which predominantly includes areas having trade and commerce activities, businesses, shops, market areas, shopping complexes, convenience shopping, mandis and informal markets. In Silapathar, commercial areas are located along the major roads of town such as Silapathar-Likabali Road, Lachit Borphukan Road and Jonai Road. The main commercial areas of the town located in Ward 2, Ward 3, Ward 6, Ward 8 and Ward 10. These market areas add to the congestion along these major roads because of narrow roads and lack of proper parking spaces. The total commercial land use in the planning area is 0.43 sq. km which makes up 0.81% of the planning area. As



per URDPFI guidelines 2-3 percent of the land use area must be demarcated under commercial land use in small towns.

#### 11.3.3. Public-Semi Public

Public-Semi-public land use includes educational, healthcare, religious, government offices, post offices, police stations, socio-culture buildings and utilities such as cremation, solid waste disposal site, STP, water storage facilities, treatment plants and electric sub stations. In Silapathar, most of the administrative facilities are located along the Silapathar Likabali Road, Lachit Borphukan Road and Jonai Road. Important government offices and departments like APWD Rural Roads, NF Railways Chief Engineer's Office, and Silapathar Municipal Board Office are all located around Lachit Borphukan road in Ward 3 and Ward 10 forming the main administrative hub of Silapathar. The major educational institutes are also located along Likabali Road. St. Francis De Sales School, Silapathar Residential H.S School, Silapathar Town High School, , Residential English Higher Secondary School, , Junior Commerce College, Jr. Science College, and Don Bosco High School are some of the major primary, secondary and senior secondary education institutes in Silapathar. Apart from these, there are three higher educational institutes in Silapathar, namely, Silapathar Town College, Silapathar College and Silapathar Science college located in Ward 6, Ward 5 and Ward 8 respectively. Silapathar College is the major college of the town which offers various courses for science, commerce and humanities. Apart from this, Kabi Rabindranath Thakur High School, Sila Jan Jati High School, Borpatra Navjyoti School, Lakua Chuk Prathmik Vidyalaya and Akajan High School are few educational institutes which are located in the planning area.

In terms of healthcare facilities, the town has one hospital named as Silapathar Model Hospital. The Model Hospital is located in Ward 3 in close proximity to Likabali Road. Apart from this, one Veterinary Dispensary is Akajan Miri Village along N.H 515. There are a few private clinics in the town, which are located along Likabali Road, Lachit Borphukan Road and Jonai Road.

A large number of religious facilities are interspersed all along the planning area. Each inhabited village in the planning area has at least one temple or *namghor*. Apart from places of worship for Ahom Community, there is one Hanuman Gadhi Temple, Om Mandir as well as a Mosque located along Likabali Road. There is one Police Station in the

municipal area located in Ward 9 near the commercial area on Likabali Road. Land use under Public and Semi-Public area should be 6-8 percent in small towns, as per URDPFI guidelines.

#### 11.3.4. Recreational

Recreational facilities include parks, playgrounds, stadiums, and multi-purposed open areas. At present, two public parks, one playground, one Donyi Polo Complex, and One Sports & Cultural complex is present in the planning area. The Rajiv Gandhi Sports and Cultural Complex is the major intergrated sports facility located in Ward 3 which serves the entire municipal area. As per URDPFI guidelines, Recreational Land use needs to be 12-14 percent of the total area in small towns.

#### 11.3.5. Industrial

Industrial land use includes all the large, micro and medium and household industries. As per the URDPFI guidelines, 8-10 percent area should be designated for industrial land use in small towns. At present, there is one industry along Likabali road in the municipal area. Apart from this, a few small industries exist in the planning area along the N.H 515 in Lakhipathar Lakhipur and Sila Gaon villages.

#### 11.3.6. Transportation

Transportation Land Use includes all the roads (arterial, sub-arterial, collector and local roads), railway stations, bus stands, and airports. In Silapathar, there is one ASTC bus station located along Likabali Road in Ward 10. Apart from this, there is one railway station in the Ward 2 along the Lachit Borphukan Road. There are no airports, ISBTs and ferry services in the planning area. As per URDPFI guidelines 10-12 percent of area should be demarcated for Transportation land use in small towns

#### 11.3.7. Agriculture

Agriculture is the backbone of the economy of the region. Agriculture land use is predominant in the rural areas of Silapathar. Rice, Corn and Mustard are the main crops grown in the planning area.

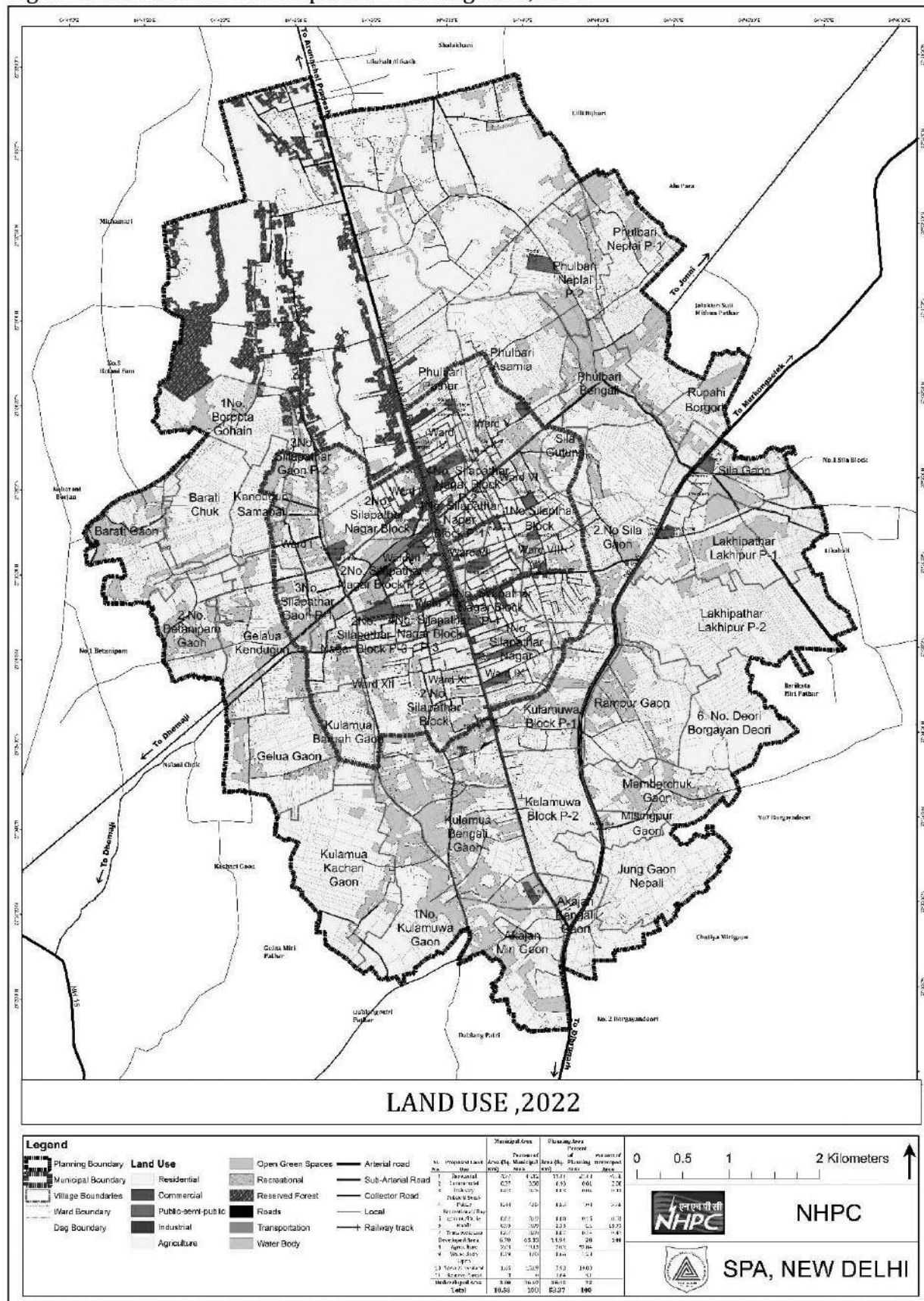
#### 11.3.8. Water Bodies

Gai-Nadi and Ghagra Rivers are the major water bodies outside the planning area. Within the planning area, small water bodies like ponds are interspersed all along the planning

area. Apart from this, a large number of private ponds are located alongside individual houses in planning as well as municipal area. Fisheries are maintained in many of these private ponds. Apart from this, marshes and small wetlands are also interspersed all along the planning area in a small number.

The existing land use, 2022 for the Silapathar Planning area has been shown in **Figure 11.1.**

Figure 11.1: Land Use for Silapathar Planning Area, 2022



Source: SPA New Delhi (2022).

# PROPOSALS



## CHAPTER 12: DEMOGRAPHIC PROJECTIONS

### 12.1. Introduction

One of the primary considerations for planning an urban settlement is population projections as it forms the basis for allocating land for all other land uses as well as provisioning of social and physical infrastructure. Total requirements for the provisioning of developed land for various uses like residential, commercial, traffic and transportation, industrial, public and semi-public spaces, green spaces, etc. and educational, health and socio-cultural facilities is computed on the basis of population projections for a planning period or master plan horizon period, which is 2041 in the case of Master Plan for Silapathar town. Hence it is necessary to have credible projections to avoid deficiencies or excess provisioning of developed land and facilities and infrastructure for the next 20 years.

There are several population projection methods such as arithmetic projection method, logistic projection method, geometric projection method, exponential projection, cohort projection method, etc. In case of Silapathar Planning Area, past population growth trends are taken into considerations for making population projections. The average decadal growth rate within Silapathar planning area is 23 percent which is almost equal to the nation urban growth rate of 26 percent. Therefore, to calculate the growth of population within planning boundary, geometric projection method has been utilized to maintain the growth rate to be 23 percent as it provides feasible result for the year 2041 (see **Table 12.1**)

Table 12.1: Population Projection for Silapathar Planning Area, 2041

Projection of Population by Geometric Method							by Arithmetic Method	
Year	Total Population	Increment	Growth Rate (in percent)	Growth Rate Mean (in percent)	Projected Population (Actual)	Estimated	Projected Population (Actual)	Estimated
1991	35,305	-	-	23				
2001	41,773	6,468	18					
2011	53,129	11,356	27					
2021	-	-	-		65,349	65,400	65,349	65,400
2031	-	-	-		80,379	81,700	78,631	78,700
2041	-	-	-		98,866	<b>1,00,000</b>	91,382	<b>91,500</b>

Source: SPA New Delhi, (2022)

When population is forecasted based on arithmetic method, the growth rate of Silapathar planning area decreases to a decadal average of 19.5 percent which is lower than the national average hence this method has not been utilized. Population trends for Silapathar Planning Area have been discussed in Chapter 2. As population growth is 2.3 percent per annum, the projected population is calculated as 65,349 which is corrected to 65,400 for 2021, 80,379 corrected to 81,700 for 2031 and 98,866 corrected to 100,000 for 2041.

## CHAPTER 13: PROPOSAL FOR HOUSING AND HABITAT

### 13.1. Introduction

In the preparation of a Master plan, the housing sector is an important integral part of the process because it ensures that each person in the town has a liveable housing with basic necessary amenities and infrastructure facilities. Housing entails more than just constructing a structure; it entails developing a safe, liveable neighbourhood with essential amenities such as access to good weather roads, water supply, proper drainage, sanitation, social amenities, and so on.

Planning strategies that aim to provide affordable housing to all include residential land allocation, urban regeneration and re-densification projects, public housing, encouraging private participation through incentives, and so on. Furthermore, the central government's flagship project, namely PMAY U would aid in the provision of affordable housing options within the Silapathar planning area.

Using an inclusive planning approach, the Master Plan for Silapathar, 2041 anticipates providing various housing options to each household with distinct income group by 2041. Silapathar master plan also aims to provide livable housing with the necessary infrastructure and amenities to every resident in a community. The proposals are adaptable enough to account for changes in housing diversity as communities grow over time.

### 13.2. Housing Need, 2041

Housing demand is projected for the horizon year 2041 as shown in **Table 13.1**. Only 10,516 housing stocks are currently available, which leaves a 3,399-dwelling shortage in 2021. In 2031, the overall housing shortage will be 8,052 homes. Finally, if current trends continue, the overall housing shortfall will be roughly 13,294 dwellings by 2041.

Table 13.1: Housing Assessment for Silapathar Planning Area, 2041

Aspects	2021	2031	2041
Population	65,400	81,700	100,000
Family Size	4.7	4.4	4.2
Projected Housing need	13,915	18,568	23,810

Aspects	2021	2031	2041
Available Housing Stock	10,516	10,516	10,516
Housing Gap	3,399	8,052	13,294
Total Housing Supply	0	8,100	13,294

Source: SPA New Delhi (2022)

To fill this housing deficit, 8,100 houses are planned in the first decade, 2021-31, and by 2041 total 13,294 dwellings are proposed to meet the housing need. It is assumed that there will be decrease in family size with more nuclear families residing in the planning area seeking economic opportunities.

### 13.3. Proposed Housing Options

In order to accommodate the projected population 1653.14 hectare land is allocated for residential development which includes existing residential (1084.74 hectare) and proposed residential (568.40 hectare). Plotted and group housing options are proposed for Silapathar Master Plan 2041. Since developed land could be easily made available more plotted housing is proposed. Most of the population i.e., 1,00,000 would be accommodated in plotted housing and remaining 15,000 population comprising industrial workers and their dependent population will be accommodated in group housing.

Table 13.2: Housing Options for Silapathar, 2041

Sl. No.	Housing Typology	Area in Hectare	Population	Gross Density	Remarks
1	Plotted Housing	<ul style="list-style-type: none"> <li>Proposed residential</li> <li>Proposed mix-use</li> </ul> 1503.14	85,000	57	For resident population
2	Group Housing	150.00	15,000	100	Specifically for industrial workers and their dependent population
<b>Total=</b>		<b>1653.14</b>	<b>100,000</b>		

Source: SPA New Delhi (2022)

Reasonably large residential plot sizes are proposed for all families of different economic classes as shown in **Table 13.3**.

Plotted housing is expected to be the prevalent dwelling form in the Planning Area of Silapathar. The projected land use section discusses the land needed for housing. It is also

estimated that 55 percent of the population belongs to the EWS and LIG categories, 35 percent to the MIG category (25 percent MIG-I and 10 percent MIG-II categories), and 10 percent to the HIG category, with 5 percent belonging to HIG-I and 5 percent belonging to HIG-II (see **Table 13.3**). Spatial allocation of land for different land uses is based on a specific approach. This approach seeks to first allocate vacant lands within the municipal area for development. Once vacant municipal lands are exhausted, land within the planning area is proposed for further use. Master Plan for Silapathar, 2041 has made spatial allocations of residential land for housing, which is situated in the municipal area and adjacent to municipal boundary and important roads in planning area (see **Table 13.3**).

Table 13.3: Proposed Plotted Housing Options Based on Distinct Economic Classes in Silapathar, 2041

Sl. No.	Economic Class	Plot Size in sq m	Projected Population in Each Economic Class		Number of DUs	Maximum Plot Area Required		Density
			Numbers	Percent		Hectare	Percent	PPH
1	Economically Weaker Sections	50-100	7,974	20	1,899	19	12	100
2	Low Income Groups	100-200	7,974	20	1,899	38	20	50
3	Middle Income Groups – I	200-300	9,968	25	2,373	71	30	33
4	Middle Income Groups – II	300-400	7,974	20	1,899	76	16	25

5	High Income Groups – I	400-500	3,987	10	949	47	10	20
6	High Income Groups – II	500-600	1,994	5	475	28	12	17
Total=			39,871	100	9,493	280	100	

Note: Land for residential use is calculated based on higher side of each plot range.

Source: SPA New Delhi (2022)

### 13.4. Residential Area and Density Distribution

Findings of analysis make it evident that low-density residential areas will continue to exist. Keeping this in view, Master plan of Silapathar, 2041 suggests a gross residential density of nearly 44 person per hectare.

With this in mind, a residential density of 57 pph is suggested for plotted development and a significantly higher density (i.e. 100 pph) is suggested for industrial workers and their dependent population. The density would further vary based upon various proposed housing options for plotted housing such as 100 pph for economically weaker section, 50 pph for LIG income group followed by 33 pph, 25 pph, 20 pph, 17 pph for MIG-I, MIG-II, HIG-I and HIG-II respectively.

### 13.5. Proposal for Residential and Mixed-use Development

Following considerations are to be incorporated in policy level in case of residential and mixed-use development:

- The houses which have been displaced due to widening of roads and provision of other social and physical infrastructures are to be provided at the nearest proposed residential sectors.
- Community development and layout planning must be taken up to take care of basic civic infrastructure like water, sanitation, electricity and social infrastructure like open public spaces, commercial shops, entertainment etc.

- For residential-commercial mixed-use development as proposed in Silapathar Master Plan, 2041; the development shall take place as per Assam Notified Urban Areas (other than Guwahati) Building Rules 2014 as shown below in **Table 13.4**.

Table 13.4: Residential-Commercial Mixed-use Development

Plot Size (sq.m)	Maximum FAR	Maximum Ground Coverage (%)
Upto 300	200	50
301 to 500	200	45
Above 500	225	40

Source: Assam Notified Urban Areas (other than Guwahati) Building Rules, 2014



[illegible]

Source: SPA New Delhi (2022)

## CHAPTER 14: PROPOSAL FOR ECONOMY

### 14.1. Introduction

An urban settlement's economy is its backbone. A thriving economy is dependent on expanding and diverse industries, trade, and commerce. It does, however, rely on highly trained human labour equipped with the skills required by modern industrial, commercial, and trade practises. The abundance of locally available raw materials at relatively low prices may increase the likelihood of rapid economic growth. The following proposals are made based on these conditions as analysed in the economy section of the Master Plan for Silapathar, 2041.

### 14.2. Area Distribution

Commercial in Silapathar area accounts for 1.58 percent of the total existing planning area (53.38 sq km). According to URDPFI guidelines, 2-3 percent of the land use area in small towns must be designated as commercial land use. Thus, commercial land use accounts for 2.43 percent of developable land area. This commercial activity is further subdivided into wholesale, retail, formal, and informal markets. Aside from that, 2.68 square kilometers (7.72 percent) of mixed-use commercial activities are to be proposed along all major roads.

Silapathar currently has only one industry, a flour mill. In the planning area, industrial areas are proposed for primarily agro-based industries. As a result, the proposed industrial area accounts for 1.44 percent of total developable area.

### 14.3. Workforce Participation Rate

According to the 2011 Census of India, the total number of workers is 19,315 out of a total population of 53,129. Only 36.22 percent of the working population is employed. Thus, in 2041, the total number of workers would be 40,000 for a total projected population of 1,00,000, assuming a workforce participation rate of 40 percent. These employees will work in the primary, secondary, and tertiary sectors, as defined below:

Primary sector - activity that is directly dependent on natural resources such as agriculture.

Secondary Sector - Activities based on raw material processing and manufacturing, i.e., industries.

Tertiary Sector - It includes a wide range of activities such as commerce, administration, transportation, financial and real estate activities, business and personal services, education, health care, and social work.

#### 14.4. Primary Sector

30 percent of the total workforce is in primary sector which are to be classified as follows:

##### 14.4.1. Agriculture and Allied Activities

Economy of Silapathar is heavily reliant on agriculture. Agriculture, animal husbandry, and forestry are all part of this sector. A significant shift is taking place in the composition of this sector. Agriculture employed only 47.7 percent of the population in 2011. The main causes of this decline were frequent flooding, a lack of irrigation, and a lack of open markets to sell the produce. Commercial crops are proposed to be grown within the planning area to increase farmer income. In the early stages of town development, government incentives are proposed. Because rice and other cereal crops are the most important crops grown in Silapathar, it should be suggested that they be traded.

#### 14.5. Secondary Sector

Industries are key drivers of economic development and job creation in any urban area. The analysis shows that the Silapathar Planning Area has been devoid of industrial development for far too long. Except for a few small-scale mills, there is little industry.

Silapathar has a large skilled workforce that has been trained in weaving and hand looming. As a result, there is potential for the growth of silk-based handloom industries. Furthermore, because there is a large workforce engaged in agricultural practices, food processing industries are proposed to boost agricultural produce within and across the Silapathar planning area. The Master Plan for Silapathar, 2041 proposes that the Government of Assam provide a package of special incentives for the development of small and medium-scale handloom, agro, and food processing industries. These industries could make use of raw materials that are currently exported from the district.

According to the proposed land use, the industrial sector accounts for almost 0.94 percent of the overall planning area. The master plan offers 28.45 hectares of land for handloom and textile industries along north of railway line entering Silapathar from the west of the municipal area and 17.04 hectares of land for agro-based industries close to state highway

leading to Murkongselek. It is a suitable spatial location for the effective operation of the proposed industrial zones because both planned industrial areas are well connected by road and rail. Furthermore, housing for the workforce involved in industries will be provided in the vicinity of these areas in the form of group housing. These industrial areas will also attract a workforce that is expected to account for 20% of total workforce participation in 2041.

#### 14.6. Tertiary Sector

The remaining 50 percent of workforce is in tertiary sector in retail and wholesale commerce and informal markets as shown below:

##### 14.6.1. Trade and Commerce

Master Plan for Silapathar, 2041 aims to maintain as well as enhance economic growth in Silapathar town by developing it as a commercial hub. For the development of trade and commerce activities, there is a need to rejuvenate and redevelop the existing commercial area with better accessibility and parking spaces, and allocation of additional area for commerce. Thus, weekly market area beside Silapathar Municipal Board will be redeveloped in form of multi-storey shopping complex. This will help to formalise the commercial activities and provide more accessibility. It can be developed in form of multi-storey shopping with parking on lower floors and shopping areas on upper floors.

With university proposed along state highway leading to Murkongselek, an opportunity for developing additional area for commerce has become available. This is proposed in form of community shopping center close to the technical university. The area of the community shopping center is 5 hectares. This proposal has a merit because the proposed commercial area has good accessibility, and it is located adjacent to the proposed university establishments. Central location and high accessibility would facilitate fast development of the commercial hub in the Silapathar town and will generate additional revenues for the government.

This commercial land use proposed near the Technical University will further facilitate the demand for commercial necessities like pharmacies, restaurants, and lodging facilities for the students as well as hospital users. This would also help to attract people from

neighbouring areas of the Silapathar planning area. Additional revenues are needed for continual maintenance of the town by the municipality, which is not possible with the current low tax base.

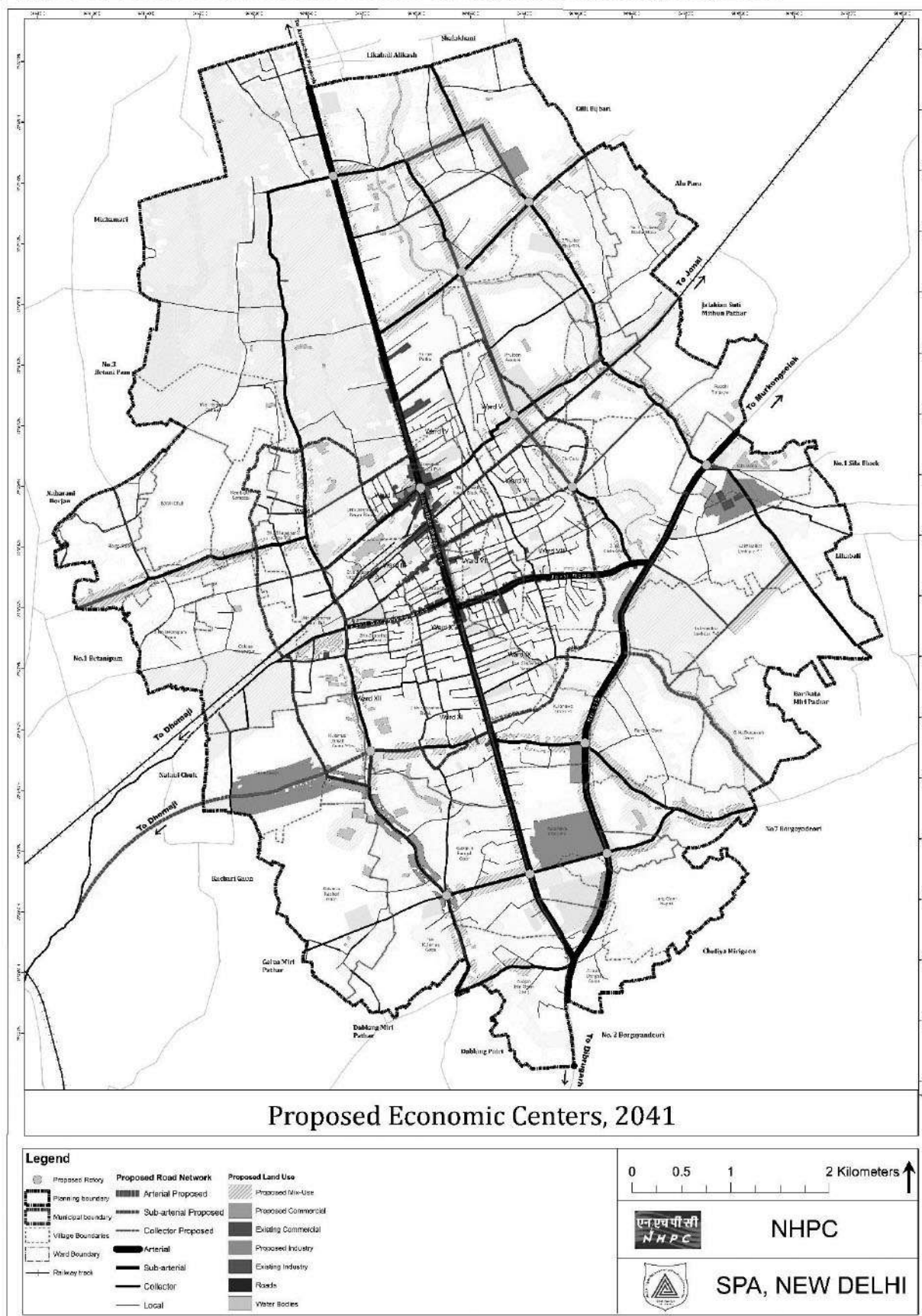
Furthermore, Mixed-use use has been proposed along all the major roads and bypass to match the commerce demand of these areas. Mixed-use on both sides of majority of the sub-arterial and collector will also provide the opportunity and flexibility to expand their residential spaces into commercial areas based on the future demand growth of the area. More parking spaces will be needed as a well-planned modern commercial hub develops and more people visit the town. Parking lots are proposed to be built within commercial complexes.

#### 14.6.2. Informal Markets

Master Plan for Silapathar, 2041 seeks to promote inclusive economic development. So, the master plan makes provisions for safeguarding the interests of street vendors, vegetable vendors, and fruit vendors. Thus, the existing ground which caters the daily market and other vendors is proposed for informal market in a planned manner. This place will host fruits and vegetable vendors. This place is to be developed as a wholesale market for vegetable and fruits for the town and surrounding areas with proper parking and other civic amenities.

Thus, the proposed economic centres in Silapathar Planning Area 2041 have been shown below in **Figure 14.1**.

Figure 14.1: Proposed Economic Centres in Silapathar Planning Area, 2041



Source: SPA, New Delhi (2022).



## **CHAPTER 15: PROPOSAL FOR TRAFFIC AND TRANSPORTATION**

### **15.1. Introduction**

The efficient spatial linkages between various land uses and activity systems are ensured by an adequate and optimized traffic and transportation infrastructure. The expansion or contraction of urban areas, as well as the direction in which they are expanding or contracting, are significantly influenced by the comprehensive mobility of the areas. Cities that are jam-packed with people who are stuck in traffic for hours on end do little to advance the economy. Excellent public transportation systems support economic growth and vastly raise the standards of living of the citizens. The mobility needs of the area change concurrently with the spatiotemporal changes in the growth of the area. Therefore, it becomes crucial to not only foresee these demands but also to provide the best solutions for their effective execution. To fulfil the many mobility-related needs of the Silapathar planning area, the proposals for traffic and transportation are divided into short-term and long-term plans. Plans for the immediate future deal with pressing problems that must be tackled in order to reduce congestion and traffic jams in core areas of Silapathar. Plans for the long-term focus on supporting the infrastructure required for transportation to support the region's effective traffic flow, comprehensive mobility, and connectivity to neighbouring regions.

### **15.2. Short-Term Proposals**

#### **15.2.1. Off-street Parking**

The findings of parking surveys conducted on Silapathar Town's main arterial and sub-arterial roads show that the current parking provisions in terms of off-street parking are inadequate. It was observed that most of the vehicles are parked along the Silapathar-Likabali road which hinders the pedestrian movement. The number of parking spots currently available remain completely always occupied often leading to increase on-street parking in undesignated spots all along the main road. This issue is especially prevalent in commercial areas along the Likabali road. On-street parking in undesignated spots also forms the main cause of reduced road capacity and traffic congestion. Since the master plan of Silapathar has proposed more commercial facilities in the core areas, the parking



demand is bound to increase. Keeping the above-mentioned issues in mind, the Master Plan for Silapathar, 2041 proposes off-street parking lots to be constructed in the required capacity along with all upcoming commercial and public-semi-public establishments that are bound to witness heavy footfall in the future. Urban Design interventions also need to be made along all the proposed arterial; and sub-arterial roads, so as to separate the carriageways from existing off-street parking areas. The master plan proposed dedicated parking spaces for a minimum of 600 ECS to facilitate off-street parking for the core commercial areas (**see Table 18.1**). The master plan proposed to shift the existing bus stand closer to the railway station and the vacated site of the bus stand to be converted into a parking facility of 150 ECS capacity. One parking facility of 1.2 hectares and 450 ECS capacity has been proposed in front of the Police Station.

**Table 18.1: Proposals for Off-Street Parking in Silapathar Town, 2041**

<b>Off Street Parking Locations</b>	<b>Area in Hectares</b>	<b>Capacity in ECS</b>
Vacated site of Bus Stand	0.4	150
Infront of Police Station	1.2	450

Additionally, it has been proposed in the Development Control Regulations that according to the built-up area and land uses, a property's premises should have a minimum amount of dedicated parking space.

#### 15.2.2. Inter-state Bus Terminal

The current ASTC bus stand is located adjacent to the market on Likabali road in the heart of the city. Due to this, regular congestion can be seen in various places near the market and bus stand. The size of the existing bus stand is also small. The infrastructure the bus stand is in a bad state of deterioration. In light of this, a new ISBT with a 5-hectare area has been proposed in Gelua Kendaguri village on Railway Station Road. The proposed ISBT is in close proximity to the Railway Station, Proposed Industrial Area as well as the proposed Truck Terminal. The location was strategically chosen in order to completely remove any interstate and intercity bus congestion from the centre of the city.

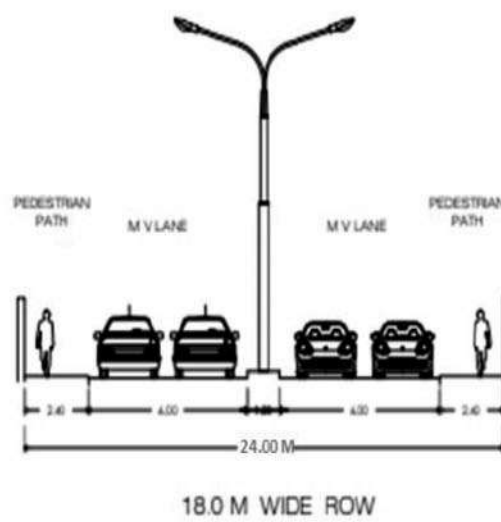
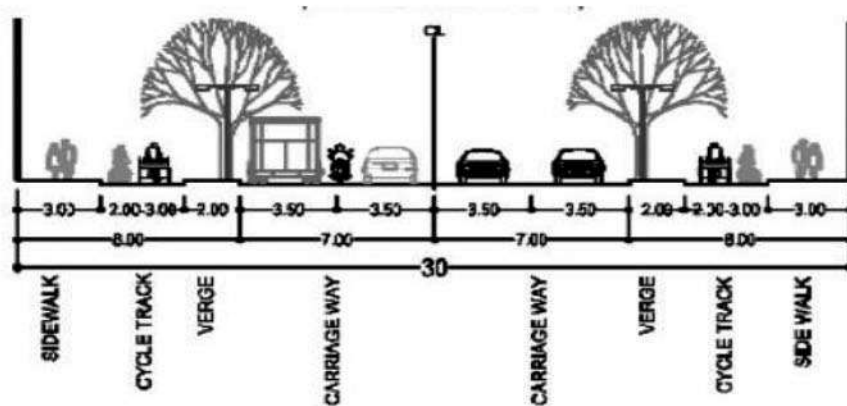
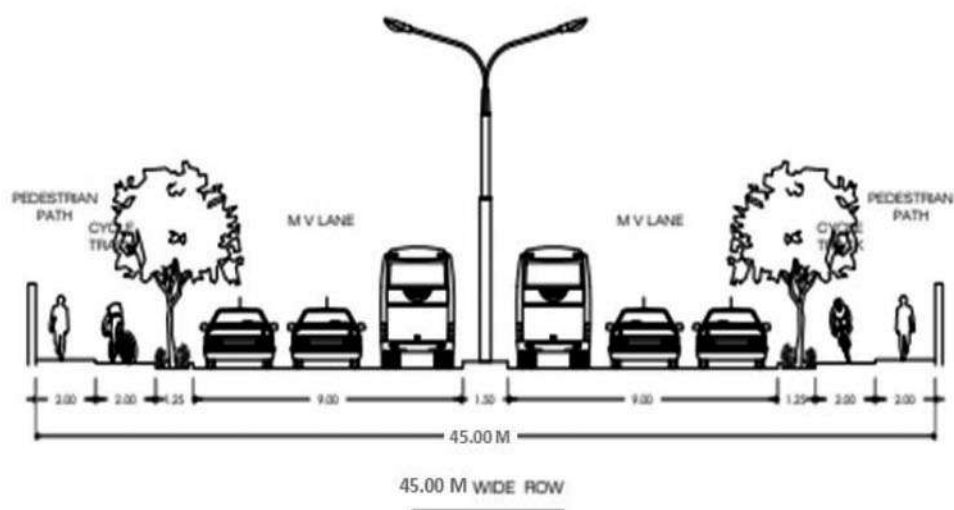
### 15.3. Long-Term Proposals

#### 15.3.1. Proposed Road Network

The analysis of road inventory in the planning area revealed that the existing road network of Silapathar is highly inefficient both qualitatively and quantitatively. In light of this, strengthening of road network has been the prime focus of the proposed circulation plan. The master plan proposes to achieve this through two kinds of interventions: Widening existing roads and Construction of new roads as per the planning area's requirements. The existing Silapathar-Likabali Road and N.H 515 are proposed to be widened to a ROW of 45 meters to form the major axis of arterial roads in the town. Additionally, all major roads bifurcating from these arterial roads have been proposed to be upgraded to a sub-arterial level by widening them to a ROW of 30 meters. All major roads bifurcating from the proposed sub-arterial roads, which connect major residential settlements and public-semi-public areas, are proposed to be upgraded to a ROW of 18 meters.

New arterial road has been proposed in 2 no. Silapathar Nagar Block village near the railway station. New sub-arterial and collector roads have been proposed in the existing and proposed residential areas connecting Phulbari Nepali, Phulbari Asamia, Lakhipathar Lakhipur, Kulamuwa Block, Rampur Gaon, 6 No. Deori Borgayan Gaon, Rupahi Borgaon, and Sila Gutung villages. The Master Plan for Silapathar, 2041 proposes a gridiron pattern of new roads which will have grids of 1 kilometre by 1 kilometre. Existing road network and built-up areas have been taken into consideration while planning of new roads. The proposals for new roads have been drafted by keeping in mind the relocation and resettlement aspects of the existing population. Extreme care has been taken to align new roads and widen existing roads so that only a negligible amount of the population has to relocate. Arterial roads have been proposed with a 45-meter right of way, sub-arterial roads with a 30-meter right of way, and collector roads with a minimum 18-meter right of way. Proposed cross sections of these three types of roads are presented as per IRC 86 as shown in **Figure 15.1**.

Figure 15.1: Proposed Cross Sections of Roads, 2041

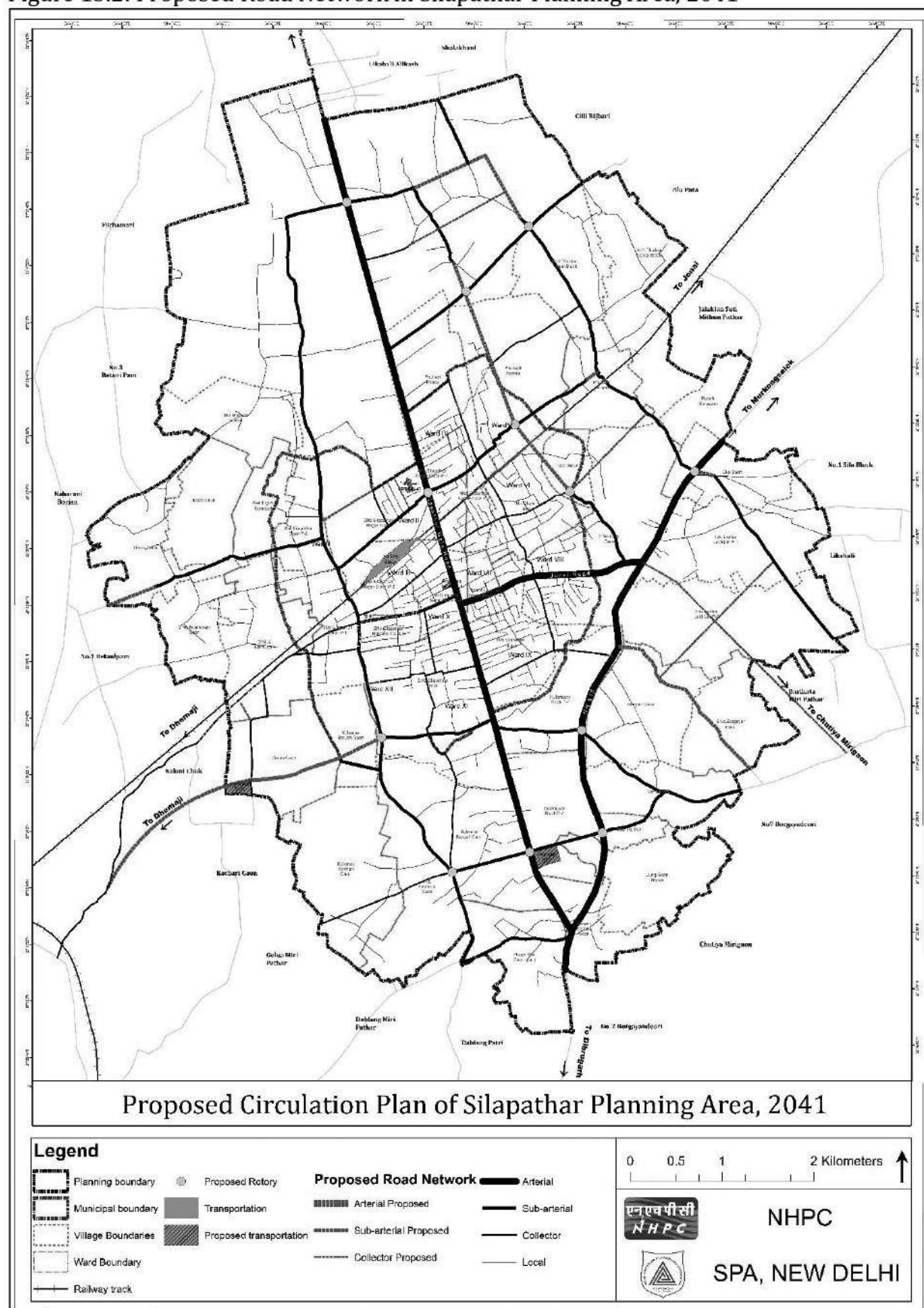


The levels of all major roads have also been fixed from the mean sea level for the effective and accurate execution of the proposed road network. Contour lines at 3m were generated for the entire planning area and the contour levels were obtained along major roads using the Digital Elevation Modelling (DEM) data for the planning area. The contour levels of the planning area range between 87m on the western side to 111 m on the eastern side. Contour points along the major roads have been shown in **Figure 15.3**.

#### 15.3.2. Truck terminal

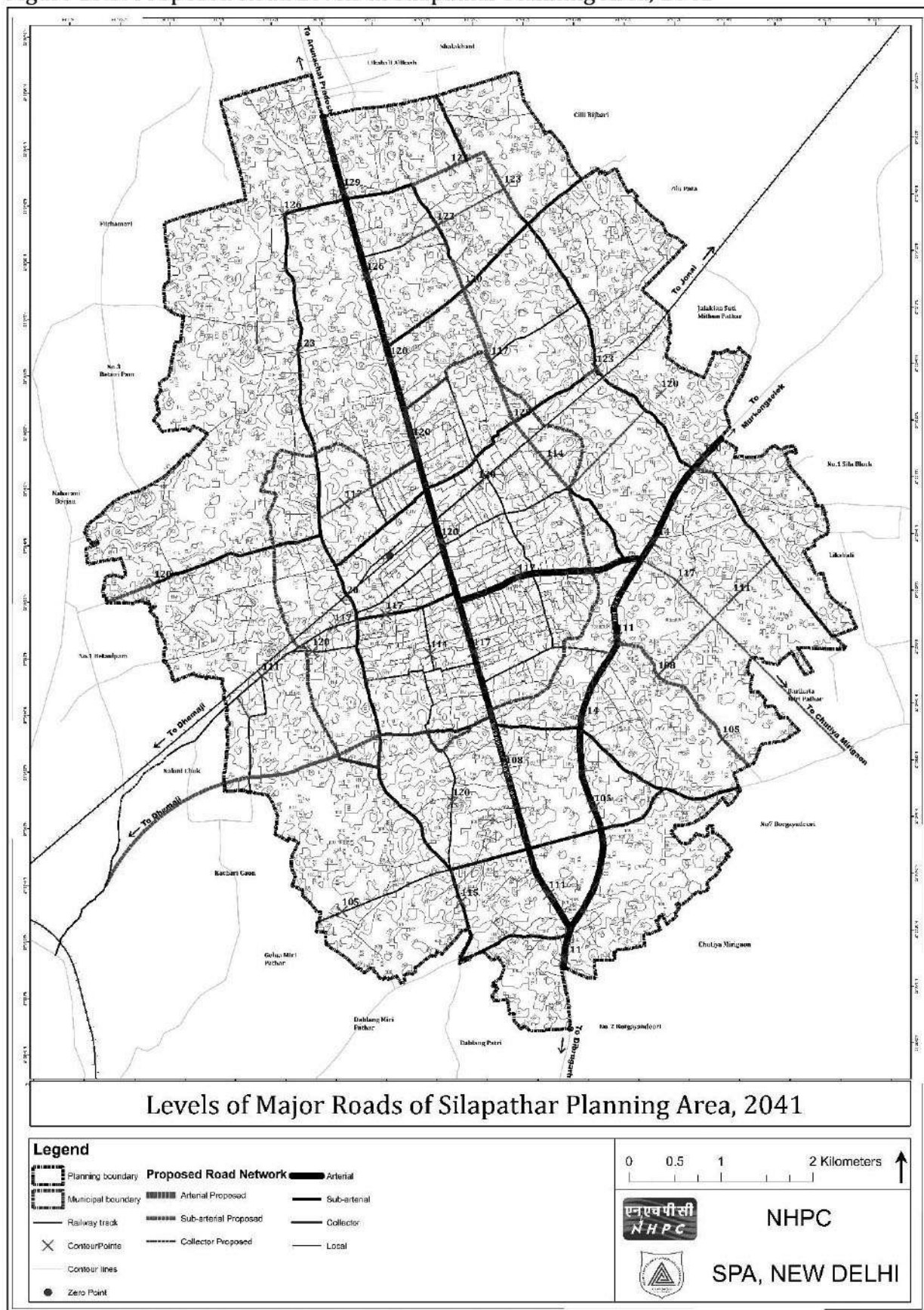
Proposed industrial development is bound to increase the logistics flow in the planning area. In light of this, one ICD- truck terminal having an area of 3 hectares has been proposed in Gelua Kendaguri village, adjacent to the proposed Railway Station and proposed industrial area. The truck terminus has been proposed to meet the logistical requirements of both the proposed industrial areas. All the proposed transport nodes have been shown in **Figure 15.2**.

Figure 15.2: Proposed Road Network in Silapathar Planning Area, 2041



Source: SPA, New Delhi (2022).

Figure 15.3: Proposed Road Levels in Silapathar Planning Area, 2041



Source: SPA, New Delhi (2022).



## **CHAPTER 16: PROPOSAL FOR SOCIAL INFRASTRUCTURE**

### **16.1. Introduction**

The social infrastructure facilities and amenities ensure better quality of social life in a town and proposed areas of public. It majorly involves education and health sectors, which are significant drivers of societal development. Literate population with skills in demand promotes economic and social equality and equity. Healthy citizens are an asset for economic and social development of a town. Likewise social infrastructure facilities and amenities would contribute to the vibrancy of Silapathar. So, both education and health are important for a healthy and wealthy town with high quality of life. Extensive zoning for major institutional uses, healthcare facilities, recreational areas and other amenities have been proposed in different parts of Silapathar.

### **16.2. Education**

Although there is sufficient number of primary schools a few of the villages lack such facilities. Also, there is a severe lack of secondary, senior secondary and higher education in Silapathar, hence the proposal for educational facilities is mostly related to the above mentioned facility.

The projected population for Silapathar in 2041 is 1,00,000. As per URDPFI Guidelines, 2015, 20 numbers of Secondary Schools are required and at present there are 12 secondary schools in Silapathar. Hence the remaining gaps of 8 secondary schools of area 1 hectare each are proposed and to be distributed equally all over the planning area. Also, for senior secondary schools, 13 are required, and at present there are only 2. Thus, 11 senior secondary schools of area 1.8 hectares each are proposed.

In Silapathar there is no school for physically challenged persons. Hence, as per URDPFI Guidelines, 2015, two such schools of area 0.7 hectares each are also proposed.

The number of colleges present in Silapathar is 4 which are sufficient. Infrastructure is to be improved in existing facilities.

There is lack of technical educational facilities in Silapathar hence the existing Science College has been proposed to be upgraded to Technical College with latest technology for



better education and other facilities. Additional nearby area has also been provided for the same and hence the total area of the Science College to be 10 Hectares. The number of educational facilities proposed for Silapathar, 2041 is shown in **Table 16.1**.

During the field survey by the SPA Delhi team during March 2022, it was found that the condition of most of the educational infrastructure in the town is not good. While furniture is available in most of the classrooms, the condition of the furniture and walls is poor. The condition of WASH facilities is also very poor in many of the schools. Thus, it is proposed that in existing facilities these infrastructures are to be improved.

**Table 16.1: Proposal for Educational Facilities in Silapathar, 2041**

Sl. No.	Educational Facilities	Existing Facilities	Population Served per Unit (URDPFI Standards)	Requirement (as per Standard)	Proposed	Area (in Hectare)	Remark
<b>Pre - Primary to Secondary Education</b>							
1.	Primary School (Class I to IV)	57	2,500	40	0	-	Infrastructure to be improved in existing facilities
2.	Secondary School (With Class IX and X)	12	5,000	20	8	1	To be provided as per requirement
3.	Senior Secondary School (with Class XI and XII)	2	7,500	13	11	1.8	To be provided as per requirement
4.	School for Physically Challenged	0	45,000	2	2	0.7	To be provided as per requirement
<b>Higher Education</b>							
5.	College	4	1,25,000	-	0	-	Infrastructure to be improved in existing facilities.

Source: URDPFI Guidelines 2015

### 16.3. Healthcare

Condition of healthcare facilities in Silapathar is very poor in present day context. There are insufficient healthcare facilities and those are present are not in good condition.

The projected population for Silapathar in 2041 is 1,00,000. As per RADPFI Guidelines 2015, 20 number of primary health sub-centres are required. Hence 2 more primary health sub-centres of area 0.08 hectares each are proposed for Silapathar 2041 outside the municipal area.

At present there is only one primary health centre or dispensary in Silapathar. So, to fulfill the gap, six more primary health centres of area 0.1 hectares each are proposed within the planning area. Also, one community health centre of area 0.8 hectare is proposed to serve the entire planning area.

As per the URDPFI Guidelines 2015, one number of nursing home with child welfare and maternity centre of area 0.2 to 0.3 hectare is to be proposed to deal with maternal issues, anemia and nutrition deficiency within the children. Other than that, two family welfare centres of area around 0.08 hectares each is also proposed as per requirement.

In Silapathar at present there is one specialty hospital (TB hospital) and two veterinary hospitals which are sufficient to cater the projected population in 2041.

Other than that, at present there are two hospitals present within the municipal area. Thus two more 80 bedded hospitals of area 1.0 hectare each are proposed outside the municipal area one in 2 No. Silapathar Block village and one in Phulbari Pathar village.

The number of healthcare facilities to be proposed for Silapathar 2041 is thus shown in **Table 16.2.**

Table 16.2: Proposal for Healthcare Facilities in Silapathar, 2041

Sl. No.	Type of Facilities	Available Facilities	Population Served per Unit of Health Facilities (URDPFI Standards)	Requirement (as per Standard)	Proposed	Area (in hectare)	Remark
1.	Primary Health Sub - Centre	18	5,000	20	2	0.08	Facility to be provided as per requirement
2.	Primary Health Centre or Dispensary	1	15,000	7	6	0.1	Facility to be provided as per requirement
3.	Community Health Centre	0	1,20,000	-	1	0.8	Facility to be provided
4.	Nursing Home, Child Welfare and Maternity Centre	1	45,000	2	1	0.2 - 0.3	Facility to be provided as per requirement
5.	Family Welfare Centre	0	50,000	2	2	0.08	Facility to be provided as per requirement
6.	Hospital (80 beds)	2	1,00,000	1	2	1.0	Facility to be provided outside the municipal area
7.	Speciality Hospital	1	1,00,000	1	0	-	Sufficient
8.	Veterinary Hospital	2	5,00,000	0	0	-	Sufficient

Sl. No.	Type of Facilities	Available Facilities	Population Served per Unit of Health Facilities (URDPFI Standards)	Requirement (as per Standard)	Proposed	Area (in hectare)	Remark
<b>Total</b>						<b>3.97</b>	

Source: URDPFI Guidelines 2015

#### 16.4. Recreation

It is observed that there is severe lack of recreational facilities in overall planning area, as there is no such planned green facility in Silapathar. The recreational facilities which are proposed for Silapathar, 2041 are shown in **Table 16.3**.

As per URDPFI Guidelines 2015, 20 number of housing area parks are required for the projected population. Thus 20 housing area parks of sizes 0.5 to 1.0 hectare are proposed which are to be distributed evenly within the residential sectors. Other than this, 7 neighborhood parks of size 1.2 to 2.0 hectare are proposed as per requirement as there is no such facility available. Also one Community Park of area 5 hectares is proposed in 2No. Silapathar Nagar Block which will cater the whole planning area.

One community level multipurpose ground of area 2 hectares is also proposed in 2 No. Chila Gaon, which can serve as a mela ground for the planning area.

In terms of sports facilities Silapathar also lacks such facility. At present there are no residential unit play areas. Thus, as per requirement 20 residential unit play areas of size 0.5 hectare are proposed which are to be distributed evenly. 7 neighborhood play areas of size 1.5 hectare is proposed and one District Sports Centre of area 8.0 hectares is also proposed as per URDPFI Guidelines, 2015; in Kulamua Block village along Silapathar Likabali Road which will promote sports activities within the planning area.

Table 16.3: Proposal for Recreational Facilities in Silapathar, 2041

[illegible]

Sl. No.	Category	Existing Number	Population Served per Unit (URDPFI Standards)	Requirement (as per standard)	Proposed	Area (in hectare )	Remark
1.	Housing Area Park	0	5,000	20	20	0.5 - 1.0	Facility to be provided as per requirement
2.	Neighbourhood Park	0	15,000	7	7	1.2 - 2.0	Facility to be provided as per requirement
3.	Community Park	0	1,00,000	1	1	5.0	Facility to be provided as per requirement
<b>Multipurpose Ground</b>							
4	Community Level Multipurpose Ground	0	1,00,000	1	1	2.0	Sufficient
<b>Sports Facility</b>							
5	Residential Unit Play Area	0	5,000	20	20	0.5	Facility to be provided as per requirement
6	Neighbourhood Play Area	0	15,000	7	7	1.5	Facility to be provided as per requirement
7	Divisional Sports Centre	0	1,00,000	1	1	8.0	Facility to be provided as per requirement
<b>Total</b>						<b>61.0</b>	

Source: URDPFI Guidelines 2015

### 16.5. Socio-Cultural Facilities

Silapathar also lacks in socio-cultural facilities. 20 number of Anganwadi of size 0.02 to 0.03 hectare are proposed as per requirement along with 20 number of community rooms of size 0.075 hectare. Other than these 7 numbers of community halls or barat ghar of size 0.7 hectares and one recreational club of area 1.0 hectare are proposed as per URDPFI Guidelines, 2015. These facilities are to be distributed evenly within the planning area. There are three Cremation and Burial Ground in Silapathar Planning area which is

sufficient for the projected population however, proposal has been given for the extension of area in Memberchuk Cemetery. The proposed socio-cultural facilities are provided in **Table 16.4.**

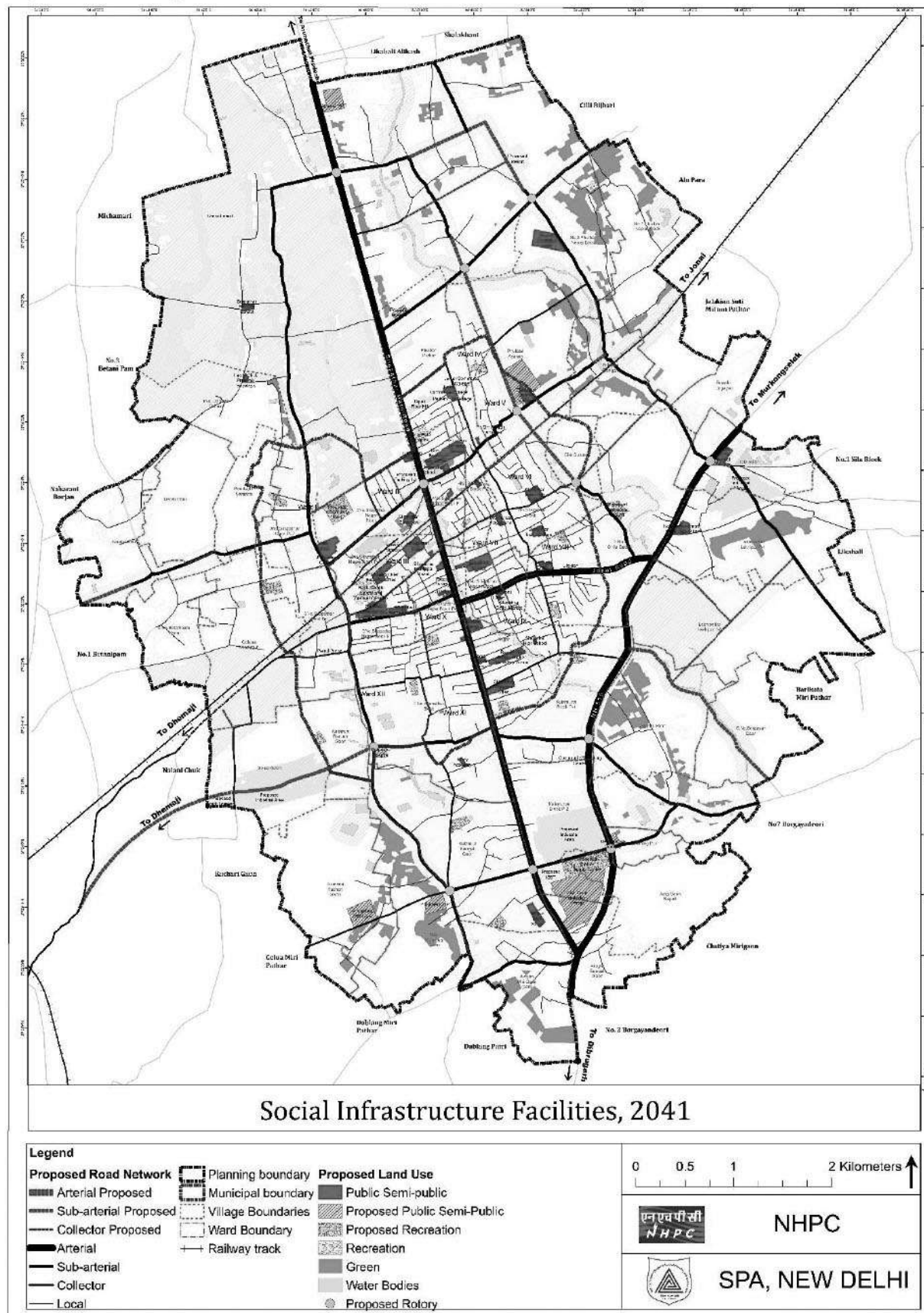
Table 16.4: Proposal for Socio Cultural Facilities in Silapathar, 2041

Sl. No.	Category	Existing Number	Population Served per Unit (URDPFI Standards)	Requirement (as per Standard)	Proposed	Area (in Hectare)	Remark
1.	Anganwadi	0	5,000	11	11	0.02-0.03	Facility to be provided as per requirement
2.	Community Room	0	5,000	11	11	0.075	Facility to be provided as per requirement
3.	Community Hall, Barat Ghar	0	15,000	4	4	0.2	Facility to be provided as per requirement
4.	Recreational Club	0	1,00,000	1	1	1.0	Facility to be provided as per requirement
<b>Total</b>						<b>4.4</b>	

Source: URDPFI Guidelines 2015

The infrastructures thus proposed are provided for the projected population of 2041 and spatially distributed to overcome the lack of such amenities within the planning area. The proposed social infrastructure facilities for Silapathar, 2041 is thus shown below in **Figure 16.1.**

Figure 16.1: Proposed Social Infrastructure Facilities for Silapathar, 2041



Source: SPA New Delhi (2022).



## **CHAPTER 17: PROPOSAL FOR PHYSICAL INFRASTRUCTURE**

### **17.1. Introduction**

Physical infrastructure, involving water supply system, storm water drainage, sewerage system, and solid waste management system, provides the lifeline to resident population of an urban settlement as well as an input and outcome for and from industry, trade, and commerce. In this chapter, the Master Plan for Silapathar 2041 begins by making spatial planning proposals for water and drainage systems.

### **17.2. Water Supply and Storm Water Drainage**

Water supply in Silapathar planning area needs extensive development as currently there is no provision of providing piped water supply to the households. As per Central Public Health Environmental Engineering Organization (CPHEEO) manual on Water Supply and Treatment 1999, 135 LPCD of water should be supplied in urban areas with piped sewerage network. As the projected population of Silapathar is 1,00,000, the total water demand is calculated to be 13.5 MLD for year 2041. As there is no provision of water supply, the total gap is calculated as 13.5 MLD. Considering 20 percent losses which include transmission loss, theft and leakages, losses will amount to 2.7 MLD hence the actual water demand is calculated to be 16.23 MLD which includes fire demand of 0.03 MLD for the year 2041. To mitigate this water demand one water treatment plants has been proposed in Silapathar planning area. The capacity of WTP will be 20 MLD which will receive the raw water supply from surface water source of Gai River flowing on the eastern side of Silapathar planning area. The design period for both WTPs will be 15 years as recommended by CPHEEO 1999 guidelines. According to URDPFI guidelines 2015 the area required for WTP for 20 MLD water supplies is 2 Ha however, to cater to the future demand of Silapathar planning area which can increase to 40 MLD, area of 4 Ha has been proposed. Distribution network will be designed for 30 years.

Gai River is not a perennial River hence an Anicut needs to be developed with water storage capacity of 600 million litres which will be sufficient to supply water for WTP for 30 days. As Anicut are designed in ways that it let excessive water runoff, hence it will not impact

the irrigation of farms on the lower side of Gai River. The development of Anicut will help in irrigation of farmlands present in Silapathar planning area.

Table 17.1: Proposal for Water Supply in Silapathar Planning Area, 2041

Projected Population for 2041	1,00,000
Per Capita Water Demand (in LPCD)	135
Total Water Demand (in MLD)	13.5
Transmission and other losses in Percent	20
Total Losses (in MLD)	2.7
Fire Demand (in MLD)	0.03
Actual Water Demand (in MLD)	16.23
Existing Supply (in MLD)	0
Demand Gap (in MLD)	16.23
<b>Proposed Water Supply (in MLD)</b>	<b>20</b>
Scope of future expansion (in MLD)	40
Area required for Water Supply System as per URDPFI (in Ha)	2
<b>Proposed Area provided (in Ha)</b>	<b>4</b>

Source: SPA New Delhi (2022).

According to the CPHEEO 1999 guidelines, the fire demand for a town with population more than 50,000 can be calculated with the formulae  $100\sqrt{P}$  where P is population. Hence, the fire demand for 2041 is calculated as 0.03 MLD and water will be supplied from WTP (see **Table 17.1**).

WTP will have four stage water cleansing procedure as suggested by the CPHEEO 1999 guidelines. The preliminary stage involves passing of raw water from protective bar and screening bar to eradicate heavier particulates. In primary stage raw water after preliminary stage is then passed through aerators to increase dissolved oxygen. This

process reduces odor and color present in raw water. In secondary process, raw water is mixed with chemicals for the process of sedimentation and flocculation to eradicate suspended particulates from raw water. The treated water is then disinfected by using chemicals such as chlorine and additional chlorine is added to treated water to keep water disinfected during supply process. Treated water is then pumped to storage reservoirs.

### 17.3. Over Head Tank (OHT)

The area required for every OHT will be 0.5 Ha which consists of guard room, pump room and inspection room. The base of the tank will be 15 to 20 meters high from ground level depending on engineering requirements. The volume of the tank is calculated as 40 lakh liters each to suffice distribution of 20 MLD water for Silapathar town. As per suitable design, if the shape of tank is rectangular, the dimensions will be 10 meters height, 20 meters length and width. If the shape is cylindrical, the dimensions will be 10 meters height and 22.6 meters in diameter. The placement of OHT is done as per population distribution to cater to every household in the town.

#### 17.3.1. Water Distribution Network

Water pipeline network is placed within proposed planning area in the entire town. The network will be equipped with pressure valves and check valves as required by engineering standards. High emphasis will be placed to reduce transmission losses, leakages, and chances of theft. Every household in the planning area will relate to proper metering setup. The network will be developed under Municipal Board of Silapathar.

#### 17.3.2. Drainage Network

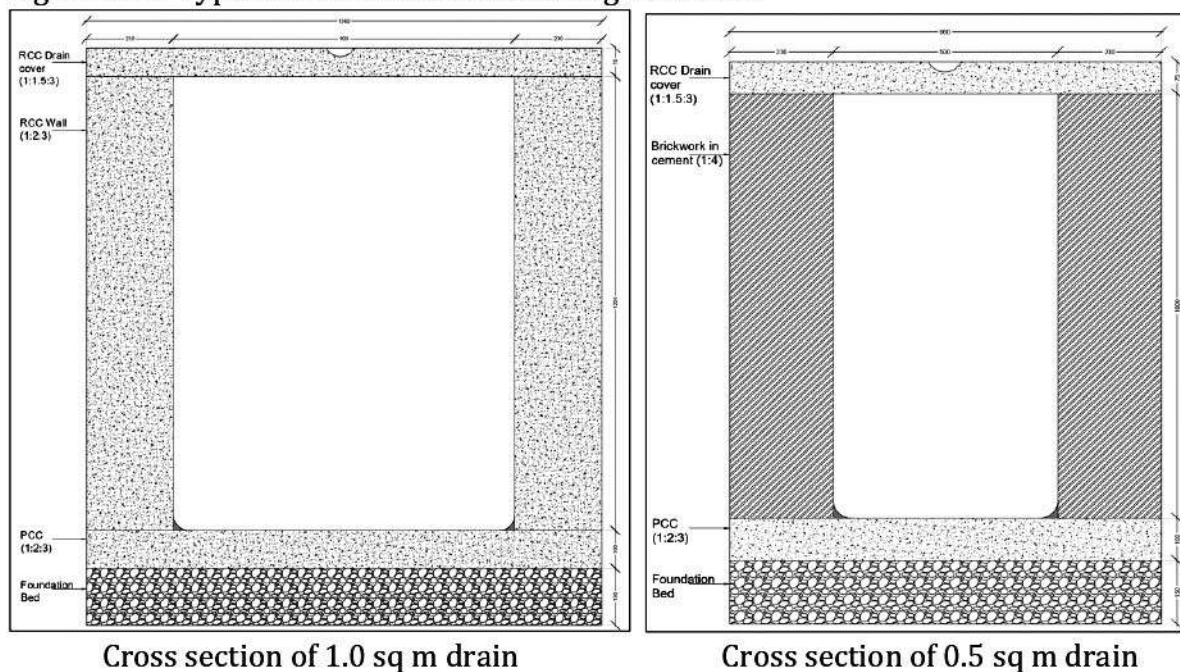
Water logging issue significantly affects life in Silapathar town as discussed in Chapter 10. To mitigate this issue, a comprehensive drainage network is proposed for the entire town. According to meteorological data provided by the India Meteorological Department, Silapathar town has recorded rainfall of 786 millimeters (mm) over a period of 31 days during the month of July 2019, which is 25.35 mm or 0.99 inches per day. To calculate peak storm water discharge, formulae of discharge is used which is a product of coefficient of runoff (C), catchment area and rainfall intensity. C is taken as 0.45 for open fields and 0.75 for built-up or constructed area. Hence peak storm water discharge is calculated as 35,349 cubic meters per hour.

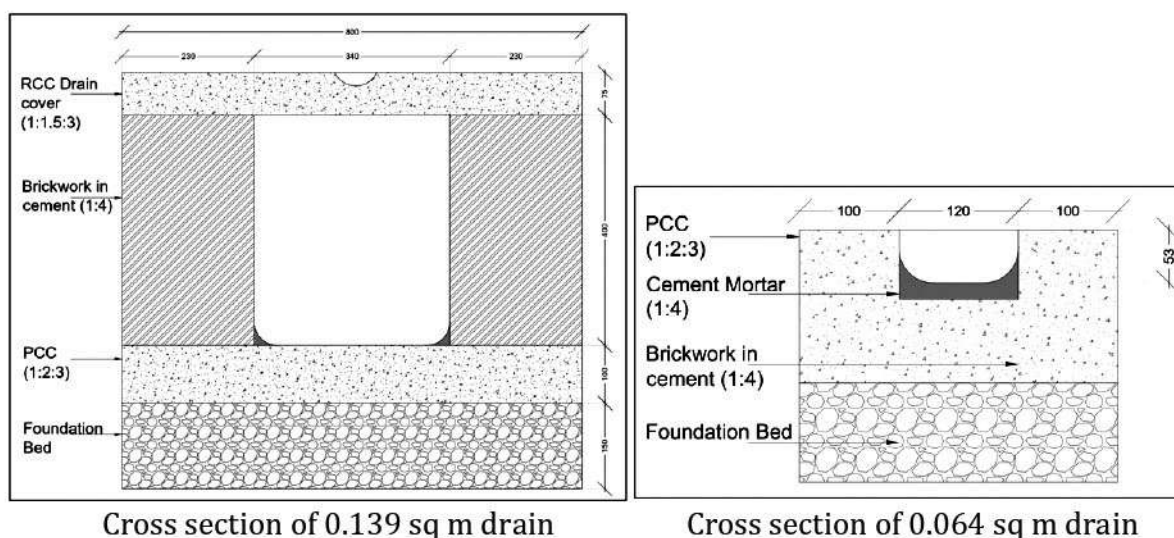
Considering storage capacity of the drainage network to be 15 minutes, the drainage system should be designed to store a volume of 9,000 cubic meters. The length of main drainage line is 20.55 km along the proposed arterial roads; 46 km for sub-main drains along sub-arterial roads; sub-sub drains of length 26.25 km along collector roads and local drains of length 121.62 km along local roads (see **Table 17.1**).

Arterial roads and sub arterial roads will have both side drainage channels with average cross-sectional area of 1 sq meter and 0.5 sq meters respectively. Collector roads and local roads will have one side drainage channels with average cross section area of 0.139 sq meter and 0.046 sq meter respectively (see **Table 17.1**). The construction of drainage network shall be as per Manual on Storm Water Drainage Systems – 2019 provided by *Central Public Health & Environmental Engineering Organisation (CPHEEO)*.

The Drainage Network will be developed by Municipal Board of Silapathar. Drainage lines shall be fully covered to avoid pollutants and solid wastes entering drainage channels which may lead to blockages. Excessive runoff will be discharged into the Gai River. Monthly inspection of drainage lines is recommended to check proper functioning of drains. The final design of Drainage section may change based on the detailed analysis and requirements of the future drainage plan.

**Figure 17.1: Typical Cross-section of Drainage Network**





#### 17.4. Sanitation

Water As per the analysis research on the sanitation system in Silapathar town, it was observed that majority of the houses have latrine facilities within their premises and alternative source of defecation were either public latrines or open defecation which causes pollution to the environment and health issues to the people residing in and around the area.

To achieve a proper sewerage system, an adequate amount of water supply is required to be connected to each household which is necessary to channelize the grey and black water to the treatment plant, for which as per the water supply demand of 20 MLD projected for the year 2041, an FSTP (Faecal Sludge Treatment Plant) of 16 MLD covering an area of 3 Ha has been proposed in No.1 Kulamua Gaon to treat the waste discharge considering conversion factor of 80% between supplied water to sewer as suggested by CPHEEO manual on sewerage and sewerage treatment system 2013. The treatment plant is designed for 15 years, and conventional sewer are designed for 30 years. The FSTP will treat effluent by Active Sludge Digestion process which is most used in STP's across India. The treated wastewater will then be discharged in the Gai River which is approx. 4 km away from the site.

#### 17.5. Solid waste management

The practice of Solid waste management is still a big challenge in Silapathar town, since open dumping in scattered places and non-segregation of waste are still practiced here. With the launch of the flagship scheme Swachh Baharat in 2015 the town has received

funds for upgrading waste infrastructure like segregated bins and trucks for waste collection, however the mixed waste ends up on the dumping site making waste processing difficult. The role of the public plays a huge role in the waste management system for which co-operation is needed from the public's end. The existing dumping ground behind the Municipal board is very close to the public market and residential area therefore in order to mitigate the issue the waste collected is transferred to the existing proposed Solid waste treatment plant which is located outside the planning boundary. Currently the existing SWTP has an area of 2Ha, but as per the population projected for 2041 the treatment plant will further be expanded to a total of 5 Ha which is situated outside the planning boundary.

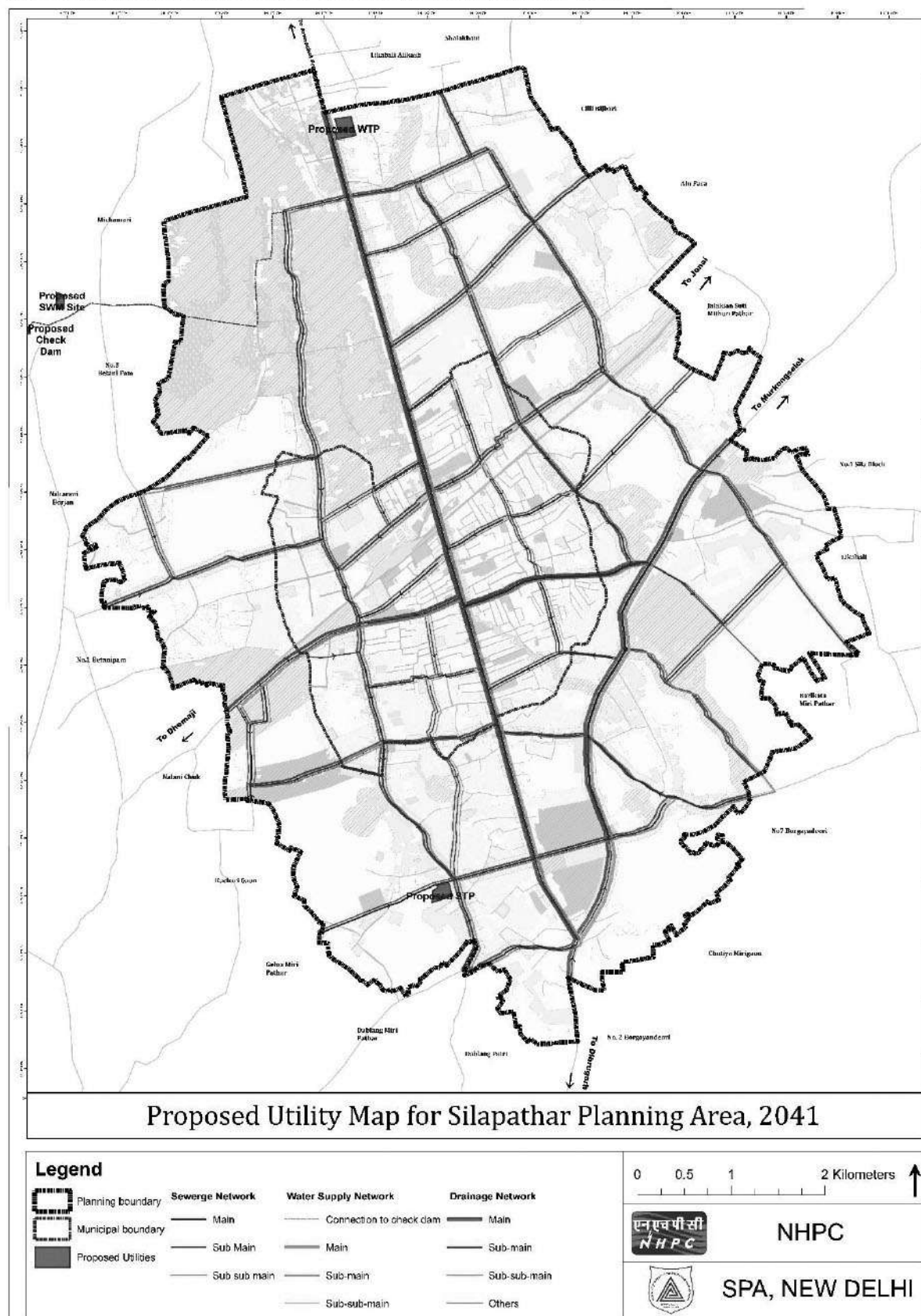
Per capita waste generation for the town, as per Proposal for Rehabilitation of Legacy Municipal Solid Waste at Dumpsite and Fresh Municipal Solid Waste 2021, is 0.3 kg waste per day. So, the total waste generation in the planning area for the projected population size of 100,000 would be 30 metric tons per day. To manage the wastes, the sites will be equipped with plastic reuse mechanism, wastepaper recycling unit and decomposition of organic waste for organic compost manufacturing which could be used by nearby cultivators for crop production.

All waste collection vehicles should be completely covered and need to have separate chambers for dry and wet waste. Waste should be collected every day and delivered to the Waste Management Site. For optimizing the process of waste management, it is proposed to encourage household dwellers to practice on-site segregation of waste, i.e., making use two separate bins for dry and wet waste. Public dustbins also need to be placed with two separate chambers in all commercial and public-semi-public areas. For the safety of waste collectors, it is advised that they wear protective gloves, masks, glasses, and helmet, for the entirety of their work period. Provision for regular health checkups of waste collectors should be made free of cost to ensure their optimal health.

The complete utility network for Silapathar Planning area has been shown in **Figure 17.2**



Figure 17.2: Proposed Utility Network of Silapathar, 2041



Source: SPA New Delhi (2022).



## **CHAPTER 18: PROPOSAL FOR ENVIRONMENT AND DISASTER**

### **18.1. Introduction**

The effects of climate change caused by humans are already severe. Human lives are already being lost as a result of climate change, and ecosystems, which are the foundation of our civilizations, are undergoing profound and permanent changes. Rapidly occurring extreme occurrences including heat waves, droughts, wildfires, tropical storms, floods, and storm surges are examples of changes that are harmful.

Given their geographic and topographical location as one of the world's heaviest rainfall regions, Assam and all of Northeast India are inherently flood-prone areas. A number of significant rivers also crisscross Assam, the Gateway of North Eastern India, coming from the lower Himalayan peaks and emptying into the plains, generating flash floods in Assam's flood plains.

Assam's Dhemaji District includes Silapathar, which has a distinctive environmental terrain and frequent water problems. The lush greenery, reserved forest, and the water bodies, etc. are a few examples of the wealth and variety of environmental assets it has. On the other side, it is continuously preoccupied with worries about disasters like flooding. The major goal of this part is to provide ways for making Silapathar an environmentally sustainable town that can both adapt to the negative effects of climate change and give its residents a safe environment.

### **18.2. Conservation of Natural Drains**

The town of Silapathar has number of rivers and rivulets. Thus, the natural drainage of the town is very well laid. However, over the years, these natural drains have been encroached by haphazard development and erosion is also taking place considering its meandering nature. This can aggravate the problem of flooding in the long run in low-lying areas of Silapathar and central municipal area. This can cause damage to both the environment and the citizens of the town. Therefore, preserving and protecting these natural drains becomes an important aspect to focus on. Strategies to adopt are discussed below in detail -

#### 18.2.1. Buffer Zone

Water bodies' buffer zones serve as barriers separating human-affected regions from rivers or other water bodies. The primary purposes of the riparian buffer zone are to safeguard the river environment by preventing flooding, protecting the water, preserving the soil, and providing home for a variety of wild species. Overall, a buffer zone is a region utilised to lessen the effects of one land use on another around a natural resource. The ecological purpose that the buffer is intended to serve as well as numerous other elements, such as soil type, slope, land use, etc., are taken into consideration when determining the buffer zone's width.

For instance, efficient buffer widths range from 1.2 m for bank stabilization to over 100 m for the provision of terrestrial habitats. For flood attenuation, buffer widths usually range from 20 m to 150 m, depending on the size of the drains. Therefore, it is proposed to have a buffer of minimum 100 m on either side of the major drains in areas where settlements have not yet come up to protect the river ecosystem.

#### 18.2.2. Ecotone Vegetation

A region that serves as a separation or transition between two ecosystems is known as an ecotone. A region of marshes between a river and its riverbank is a typical example. Greater variation in an organism can be seen in ecotones. By giving creatures who saunter around looking for food or a place to build a nest a place to nest, they create a conducive environment for a variety of organisms. These areas are also thought to be particularly vulnerable to changes brought on by the climate and by human activity, which further alter the biodiversity, structure, and functionality of the abundant flora and animals.

Numerous ecotone areas around the natural drains have been invaded and are now at risk of erosion. These areas need appropriate and prompt protection. Consequently, the suggested delineation of the buffer surrounding water bodies needs to be created and landscaped in a way that will aid in reviving the riverine ecology, boost infiltration, as well as serve to alleviate difficulties connected to soil erosion and floods. Planting appropriate endemic species of flora and wildlife that are native to the ecotone is necessary.

#### 18.2.3. Anicut and Its Impact

The water stored behind an anicut can be used for irrigation of crops or drinking water for humans and livestock. They also are used to increase the residence of water to recharge

groundwater, especially wells located downstream. With the proposal of anicut on Gai River soil erosion can also be checked and can affect green cover positively.

### 18.3. Erosion Protection Measures

The natural drains falling within the Planning Area is highly vulnerable to erosion and haphazard encroachment. To curb the adverse impacts of erosion, in terms of social, environmental, and economic losses, the following measures are proposed that can be adopted –

#### 18.3.1. Natural Vegetation

Bank erosion is significantly influenced by green cover. In general, river sides with flora erode less quickly than those without. This is due to the fact that roots of green cover typically strengthen the soil near the riverbank, making the bank less susceptible to catastrophic breakdown. Additionally, plants can serve as shock absorbers during times of intense rainfall, which further reduces erosion. This section is already discussed above under 'Ecotone Vegetation' in detail.

#### 18.3.2. Rooftop Rainwater Harvesting

The process of collecting, filtering, and storing rainfall at the surface or in subterranean aquifers before it is dispersed as surface run-off allows for the later use of the water that has been collected. This contributes to raising ground water levels. By collecting rainfall and limiting the flow of storm water to prevent flooding, it can also assist lower the risk of soil erosion and floods. Additionally, the usage of it is made possible by the presence of existing structures along the rivers.

In order to implement rooftop rainwater harvesting in Silapathar:

- Subsidies should be made available for required structures of rainwater harvesting systems.
- Strict rainwater harvesting implementation policies should be put into place for buildings with roof areas larger than 100 square metres.
- Violators of this standard should be punished and repeatedly reminded to follow the setup before facing legal consequences.

#### 18.4. Social Forestry

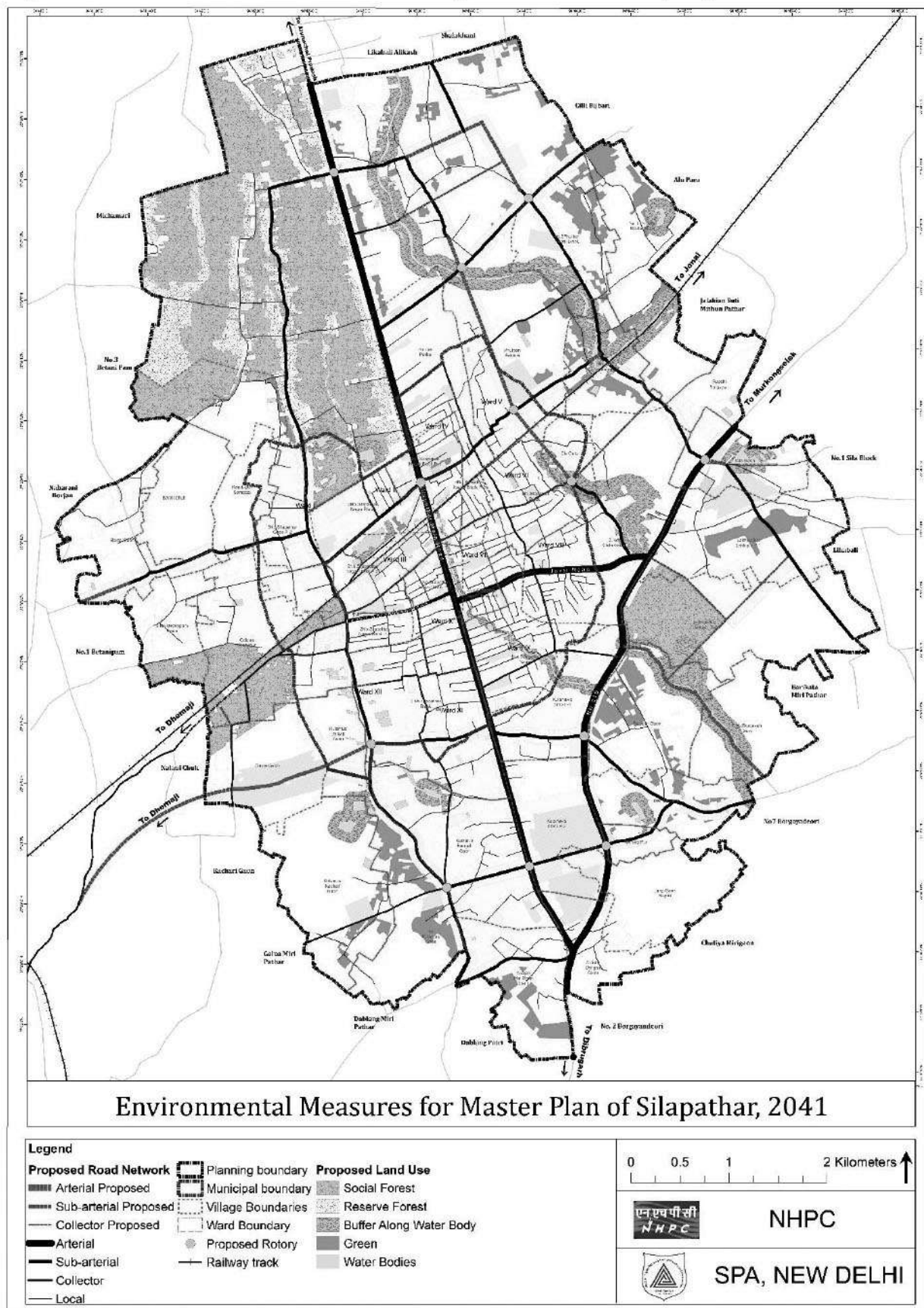
Forestry for community development is known as social forestry. In order to aid in the environmental, social, and urban-rural development, social forestry refers to the management and protection of forests as well as the afforestation of regions that are not used and left barren (underutilized land). Communities are involved in managing and using forests sustainably. In contrast to previous forestry initiatives, social forestry prioritizes the needs of nearby populations. Because of this, the primary objective of social forestry is to expand the number of trees and plantations to satisfy people's increasing demands for wood, food, fuel, and other necessities while easing strain and dependence on traditional forest regions.

A proposal for social forestry has been made around handloom and textile industries proposed along north of railway line entering Silapathar from the west of the municipal area to act as a buffer zone. It will largely help to protect adjoining residential communities from problems with health and amenities that are related to industrial pollution.

##### 18.4.1. Reserved Forest

Reserved forests are areas of forest or other lands that can be designated as such by state governments (including natural landscapes such as savanna grasslands, which are legally defined as "wastelands"). Silapathar has 663 hectares of reserved forest within its planning boundary. However, most of it has been encroached by haphazard development in this ecologically sensitive area. Thus, as per Draft Master Plan Social Forestry is proposed in reserved forest as a restoration approach as it can be effectively integrated to tackle the restoration activities both inside and outside the reserved forest areas in an inclusive manner. The combined area of proposed social forestry is 478 hectares **(See Figure 18.1)**.

Figure 18.1: Environment Measures for Silapathar Draft Masterplan, 2041



Source: SPA New Delhi (2022).

## CHAPTER 19: TOURISM PROPOSAL

### 19.1. Introduction

The Tourism industry plays an important role in building the demand and growth of the city or town. It not only contributes towards more economic activities but also generates more employment revenue and plays an important role in development.

Silapathar town is an upcoming commercial town and given the potentials and the natural resources, the town has a lot to offer in the tourism sector as well. The town is surrounded by tributary rivers on both sides which houses many picnic spots with the foothills of Arunachal Pradesh adding up to the scenic beauty of the town. The town has the potential to develop tourist destination spots which will help build and grow the economy. Therefore, the tourism industry proposals for Silapathar town will go way beyond attractive destinations, to being an important economic growth contributor.

### 19.2. Tourist Circuit

The proposal of the tourist circuit is done to connect all the significant potential tourist spots and areas located near the planning boundary of the town, to provide proper site viewing, entertainment facilities and accommodation to the tourist visiting the town. The main goal is to allow the tourists to enjoy and appreciate the facilities and the beauty the town has to offer while they stay here.

A tourist circuit is proposed connecting some of the major potential tourist spots within the town and some, which are close to the planning area. The potential tourist spots include 4 locations which are namely the Malini Than temple which is located next to the boundary of Arunachal Pradesh, the hanging bridge near the Likabali army camp which is an ideal location for site seeing and picnic camping, Prema Charitable Trust which is a Buddhist Monastery complex (visitors can witness the extensive Buddhist architecture and details here), and lastly Dimow picnic spots which located 19 kms away from the town. The Dimow picnic spot is a must stop for every tourist visiting Silapathar to witness the scenic sun set view. **Table 19.1** shows the details of the tourist circuit with each distance covered from the starting point i.e., Donyi Polo Complex (see **Table 19.1**).



Table 19.1: Tourist Circuit Silapathar 2041.

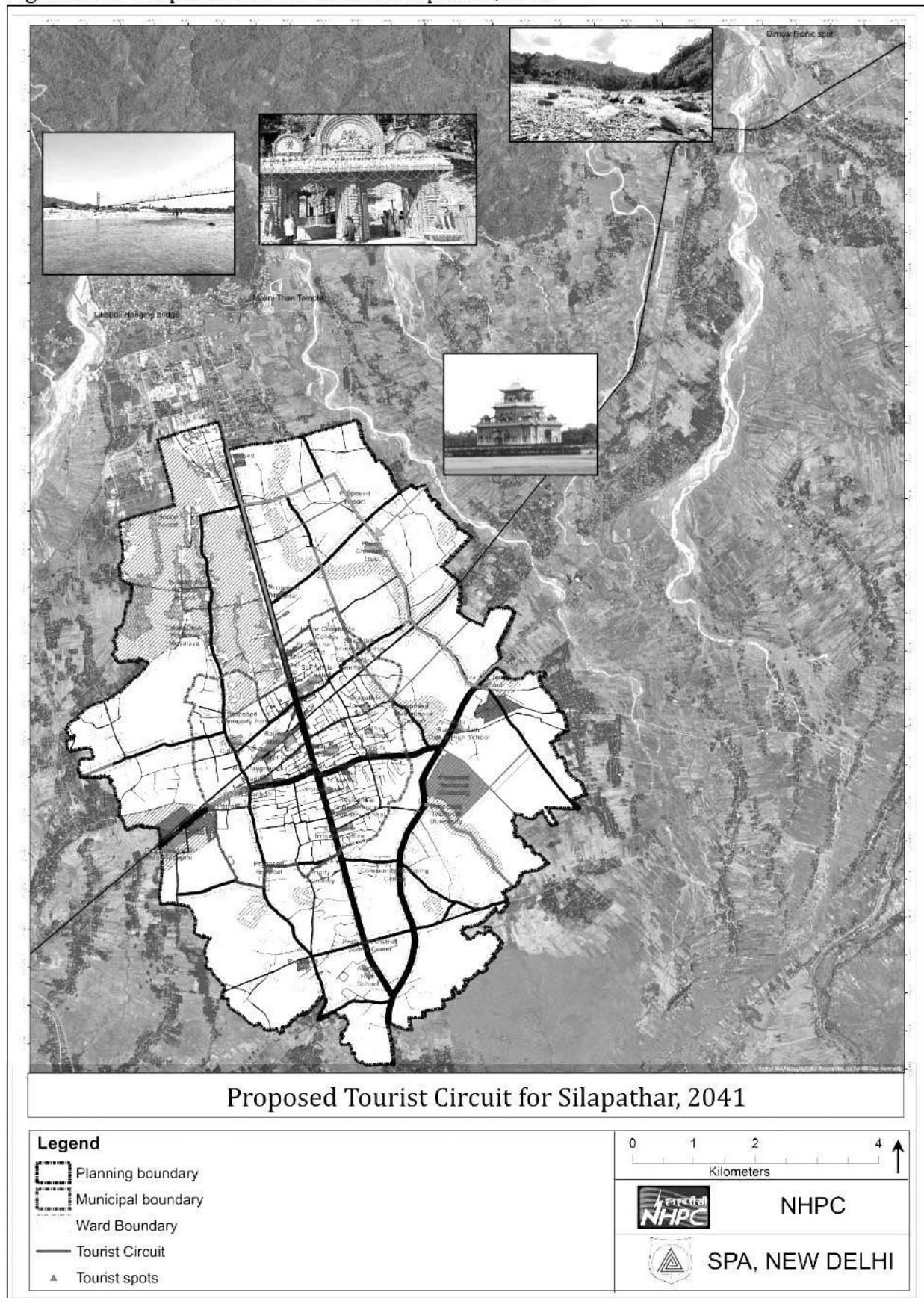
Sl. No.	Tourist Point	Length (km) from Tourist Help centre	Activities
1	Likabali Hanging Bridge	8.2	Site seeing and picnic camping
2	Malini Than Temple	6.9	Heritage temple visit, Experiencing traditional Assamese Architecture
3	Prema Charitable Trust	3.7	Heritage temple visit, Experiencing traditional Buddhist Architecture
4	Dimow Picnic spot	19	Site seeing and picnic camping

Source: SPA New Delhi, (2022)

The entire circuit covers a total of 35.7 kms starting from Donyi Polo Complex where a tourist help centre is provide to the hanging bridge, Malani Than temple, Prema Charitable trust and lastly Dimow picnic spot where the tourist can witness the sun set view and back to the town. **Figure 19.1** shows the proposed tourist circuit for Silapathar 2041.



Figure 19.1: Proposed Tourist Circuit Silapathar, 2041



Source: SPA New Delhi (2022).

### 19.3. Tourist Information Centre

A tourist Information Centre is proposed in the town inside the Donyi Polo complex, as there is no tourist information centre located in the town. Different kind of tourist facilities such as basic civic amenities (public toilets, drinking water and bins), pamphlets for tourist attraction, tourist circuit transport facility and information related to other tourist attraction near the area will be proposed in Tourist Information Center. A tourist information app will also be proposed which could be developed to facilitate management of tourist information center and to provide information regarding different tourist points.

### 19.4. River side Theme Resort

A river side theme resort having an area of 5 Ha is proposed along the proposed highway which connects to the NH 515 close to the Ghagra river. The aim and goal of the theme resort is to restore the rich culture and heritage of the State by allowing the visitors to get a glimpse of the region, by designing the resort in the traditional Assam type house which will portray the architecture of Assam. The location of the resort is proposed away from hustle and bustle of the town, yet close to most of the tourist hot spots making it a perfect location for the tourist to commute to their tourist destination.

### 19.5. River tourism

The town being in the center between the two tributary rivers, the river tourism can be promoted to grow the tourism industry by proposing water sports like rafting along a certain stretch of the river and also paragliding along the sand beds of Gai River.

### 19.6. Tourism Infrastructure

To improve the tourism infrastructure of the town basic civic amenities should be improved to get a better tourism experience output. Proper connectivity to the town, proper star rated hotels and home stay are one of the main infrastructures that needs proper attention followed by facilities like clean public toilets and drinking water station. Publicity and development of tourist sports are also important for the promotion of tourist development for which the town needs additional resources.

## CHAPTER 20: PROPOSAL FOR LAND USE

### 20.1. Introduction

Master Plan for Silapathar culminates in the proposed land use plan for the horizon year 2041. It is in this proposed land use plan that all proposed land uses, networks, and facilities are presented to provide a comprehensive view of how the town would develop till 2041.

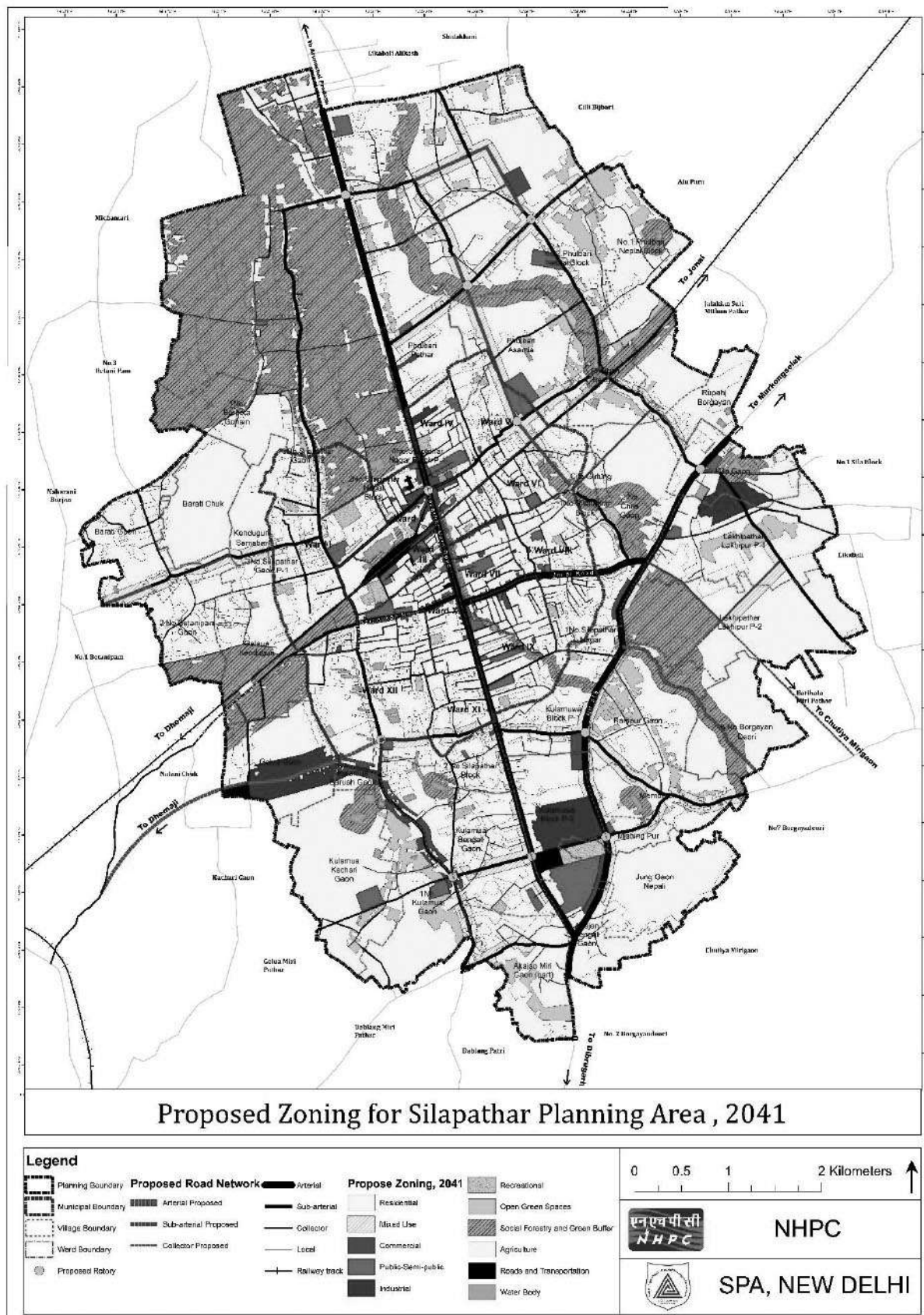
### 20.2. Zoning of the Planning Area

Zoning of the Silapathar planning area is based on population densities, existing developments, and road network including proposed developments (**see Figure 21.1**). According to article 5.1 of the Uniform Zoning Regulations 2000, the following land use zones have been identified for the Draft Master Plan of Silapathar, 2041. These include the following:

- (i) Residential Zone: (a) Low to Medium Density Residential c) Mixed Use Residential
- (ii) Commercial zone: (a) Retail Commercial (b) Wholesale Commercial c) Mixed Use
- (iii) Industrial zone
- (iv) Public and Semi-public zone
- (v) Recreational and Open Space zone
- (vi) Green buffer zone
- (vii) Agriculture zone
- (viii) Circulation
- (ix) Transportation zone
- (x) Social Forestry zone

In the residential zone low density implies density of fewer than 75 persons per hectare (PPH), medium density shall be 75-150 PPH and high density shall be over 150 PPH (see **Figure 20.1**)

Figure 20.1: Zoning of the Silapathar Planning Area, 2041



Source: SPA, New Delhi

### 20.3. Land Use Distribution

The proposed land use distribution for the horizon year 2041 is given in **Table 20.1**. Total developable land is 33.71 sq. km in the Silapathar Planning Area, 2041 and 10.02 sq.km in the Municipal Area.

Table 20.1: Proposed Land Use Distribution in Silapathar, 2041

Sl. No.	Proposed Land Use	Municipal Area		Planning Area		Percent of Developed Area
		Area (Sq. Km)	Percent of Municipal Area	Area (Sq. Km)	Percent of Planning Area	
1	Residential	6.65	62.83	16.16	30.27	<b>47.94</b>
2	Commercial	0.32	3.07	0.68	1.27	<b>2.01</b>
3	Mixed Use	0.43	4.11	2.43	4.54	<b>7.19</b>
4	Industry	0.02	0.22	0.84	1.58	<b>2.56</b>
5	Public & Semi-Public	0.43	4.10	0.96	1.79	<b>2.84</b>
6	Recreational/Play ground/Parks	0.24	2.30	0.40	0.74	<b>1.17</b>
7	Roads	1.33	12.56	3.60	6.75	<b>10.67</b>
8	Transportation	0.08	0.77	0.16	0.3	<b>0.46</b>
9	Water Body Buffer	0.24	2.24	2.65	4.97	<b>7.85</b>
10	Social Forestry	0.27	2.53	5.84	10.94	<b>17.31</b>
<b>Developed Area</b>		<b>10.02</b>	<b>94.73</b>	<b>33.71</b>	<b>63.15</b>	<b>100.00</b>
11	Agriculture	0.34	3.26	15.57	29.17	
12	Water Body	0.19	1.79	0.62	1.16	
13	Open Space/Grassland	0.02	0.23	1.89	3.54	
14	Reserve Forest	0.00	0.00	1.59	2.97	
<b>Undeveloped Area</b>		<b>0.56</b>	<b>5.27</b>	<b>19.67</b>	<b>36.85</b>	
<b>Total</b>		<b>10.58</b>	<b>100.00</b>	<b>53.37</b>	<b>100.00</b>	

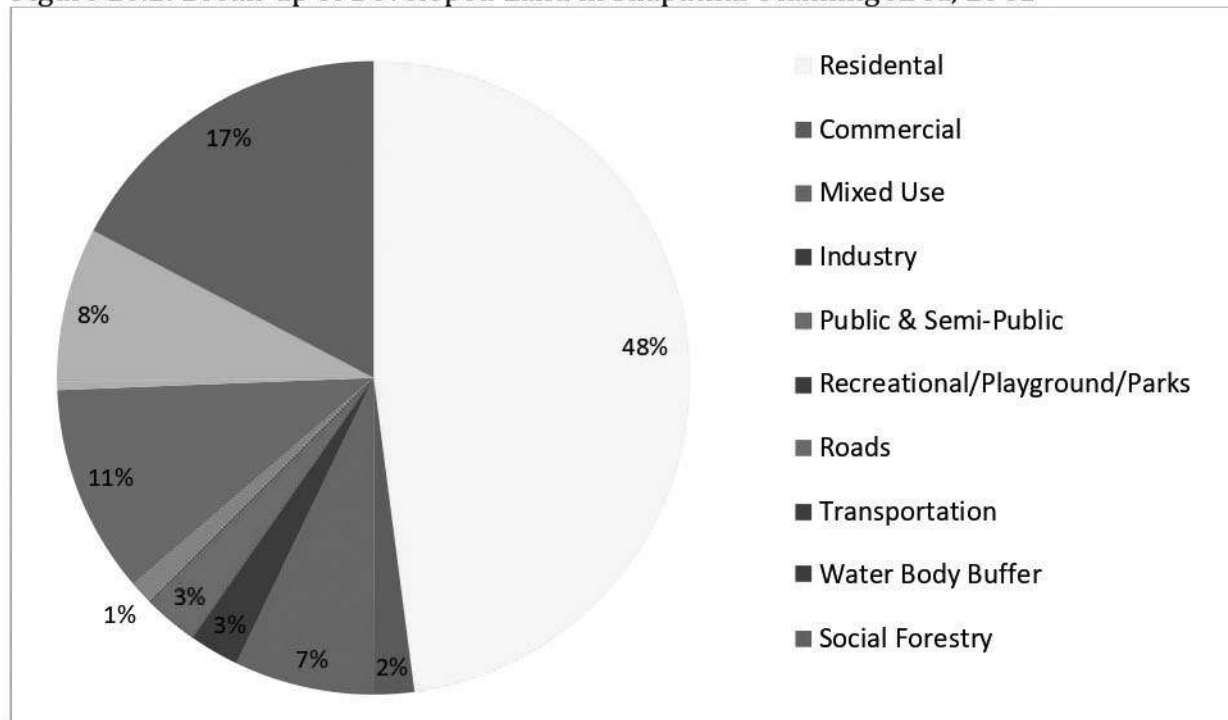
Source: SPA New Delhi (2021)

The proposed developable land use classification is in accordance with the URDPFI Guidelines, 2015 and Uniform Zoning Regulations 2000. Residential land use accounts for 47.94 percent of the total developed land within the planning area and 62.83 percent of the total municipal area. The residential land use has increased considerably in the municipal area compared to the residential land use of 2022. Commercial land use, which was only 0.81 percent of the planning area in 2022, has increased to 2.01 percent of the planning area in the proposed land use plan. Mixed land use has also been introduced, which makes



up for 7.19 percent of the developed area in proposed land use. The industrial area, which was only 0.31 percent of the developed area in 2022, has been increased to 12.56 percent of the developed area in 2041 (see **Figure 20.2**)

Figure 20.2: Break-up of Developed Land in Silapathar Planning Area, 2041



Source: SPA, New Delhi (2021).

Each land use describing the major proposals is detailed in the following sections.

#### 20.4. Residential

Residential land use refers to the areas where housing is the predominant use of land. This has been depicted using the colour yellow on the land use map. This land use category includes all the plotted developments, group housing complexes, apartments, colonies and rural settlements outside the municipal boundary. As per the URDPFI guidelines, 45-50 percent of land area should be under residential land use for small towns. The total residential area accounts for 47.58 percent of the total developed area. Most of the proposed projects like new Industrial areas, ICD Truck Terminal, ISBT etc. are being developed in the west of the town. A technical university has been proposed in the south-east side of the town. A reserve forest exists in the northeast side of the town and more social forestry areas have been proposed around the existing forest.

Within the Silapathar town, wards in the southwestern direction, i.e, Ward 1, 12, 11 and 9 have seen residential development only along the roads. Densification of residential areas has been proposed in these wards. To facilitate this, the gridiron pattern of roads has been proposed in the area. The existing residential areas in the town have haphazard and irregular development. To contain the sprawl, the residential density of the existing areas is increased. Accessibility is also increased in the existing residential areas with proposed road networks. This will facilitate further development of the existing residential areas. New residential land use has been proposed in all the wards of the town by filling in the open green spaces, vacant land and agricultural land with proposed residential developments.

Residential land Use has been proposed along all major existing and proposed roads of arterial and sub-arterial levels. Residential land Use has also been proposed along the N.H 515 and proposed Technical University. A belt of mixed residential land Use has been proposed on both sides of all arterial and sub-arterial roads in order to boost the proposed residential land use, as per the future requirement of the town.

#### 20.5. Public and Semi-Public

Total Public Semi-Public areas account for 3.42 percent of the total developed area. The existing government and important public buildings are concentrated majorly in Wards 3, 6, 9 and 4 mostly along the Silapathar-Likabali road. This area is also adjacent to the major commercial centres of the town. The sprawling commercial area, the existing concentration of government offices in a few wards and establishments like banks, hotels, etc. in close proximity to each other lead to congestion along the Likabali road in Silapathar. Therefore, the master plan has proposed all new public and semi-public developments in a decentralized manner in the planning area. To enable the overall development and well-being of citizens of the Silapathar Planning Area, adequate facilities for education, health, social-cultural development and recreation have been proposed. The facilities have been evenly distributed in the Planning Area. The number of colleges present in Silapathar is 3 which is sufficient. But, there is a lack of technical educational facilities in Silapathar, hence, one Technical University has been proposed in Lakhipathar Lakhipur village, having an area of 60 hectares. Two Hospitals of an area of 1 hectare each have been proposed for the planning area. One of the hospitals has been proposed in Ward 10 and the other one has been proposed in Phulbari Pathar village.



#### 20.6. Commercial

Total Commercial area accounts for 2.43 percent of the total developed area. A commercial area is proposed along Likabali Road and NH 515. Dedicated belts of commercial areas have been proposed near the proposed residential areas for industrial workers. A community/shopping center of 5 hectares has been proposed in Kulamuwa Block village along NH 515. Commercial land Use has been allowed as part of mixed land use wherever required along all major existing and proposed roads of Arterial and Sub Arterial levels. Furthermore, additional commercial facilities have been proposed near all the major junctions which have already been commercialised. Commercial land Use has also been proposed near the industrial area, proposed Technical University, proposed hospitals and railway station in order to facilitate the provision of all the necessary commercial facilities that might come up in the future. To boost tourism in the planning area, a resort of 5 hectares has been proposed near No. 1 Phulbari Nepali Block village.

#### 20.7. Industrial

Total Industrial area accounts for 1.44 percent of the total developed area. Silapathar Area majorly lacks industrial development. Therefore, industries are proposed in the Planning Area considering the strengths and potentials of the area. Handloom-based small-scale and medium-scale industries are proposed as there is a surplus availability of raw silk in the Dhemaji district. There is also scope for Agro-based industries in the Dhemaji district as there is a huge production of paddy and other crops in the planning area. In order to boost these industrial sectors, a total of 50 hectares of land has been allocated for industrial use.

#### 20.8. Recreational

Silapathar severely lacks organized green spaces. One District Sports Centre of area 8 hectares has also been proposed in Kulamuwa Block village to promote sports activities within the district. One community park has been proposed in Ward 1 with an area of 5 hectares. In other community recreational facilities, one multi-purpose ground of 2 hectares has been proposed in 2 No. Chila Gaon village. Other than this 7 neighbourhood parks and neighbourhood playgrounds each have been proposed to be distributed uniformly within the developable area.

### 20.9. Transportation

Total transportation facilities account for 10.85 percent of the total developed area which includes exiting roads, proposed roads, rotaries, bridges, and proposed transportation nodes. Master Plan for Silapathar, 2041 proposes off-street parking lots to be constructed in the required capacity at the vacated site of the bus stand. A new ISBT with a 5-hectare area has been proposed in Gelua Kendaguri village on Railway Station Road. The proposed ISBT is located in close proximity to the Railway Station, the Proposed Industrial Area as well as the proposed Truck Terminal. The existing Silpathar-Likabali road and NH 515 are proposed to be widened to a ROW of 45 meters to form the major axis of arterial roads in the town. Additionally, all major roads bifurcating from these arterial roads have been proposed to be upgraded to a sub-arterial level by widening them to a ROW of 30 meters. All major roads bifurcating from the proposed sub-arterial roads, which connect major residential settlements and public-semi-public areas, are proposed to be upgraded to a ROW of 18 meters. New sub-arterial and collector roads have been proposed in the existing and proposed residential areas. The Master Plan for Silapathar, 2041 proposes a gridiron pattern of new roads which will have grids of one kilometre by one kilometre. A new arterial road has been proposed in 2 no. Silapathar Nagar Block village near the railway station. New sub-arterial and collector roads have been proposed in the existing and proposed residential areas connecting Phulbari Nepali, Phulbari Asamia, Lakhipathar Lakhipur, Kulamuwa Block, Rampur Gaon, 6 No. Deori Borgayan Gaon, Rupahi Borgaon, and Sila Gutung villages. One ICD- truck terminal having an area of 3 hectares has been proposed in Gelua Kendaguri village, adjacent to the proposed Railway Station and proposed industrial area. The truck terminus has been proposed to meet the logistical requirements of both the proposed industrial areas.

### 20.10. Agriculture

Agriculture remains the primary occupation in villages within Silapathar Planning Area. Revamping of agriculture sector is also necessary. Emphasis should be placed on enhancing irrigation facilities. Various interventions are required in the agriculture marketing sector to make agriculture lucrative to farmers. Increasingly farmers should be facilitated to grow commercial crops.

#### 20.11. Social Forestry

To maintain the ecological balance of the built environment, a proposal for social forestry has been made in and around eco-sensitive areas of the Silapathar Planning Area. Additionally, social forestry has been used to create a buffer zone around industrial areas to safeguard neighbouring residential communities from potential health hazards caused by industrial pollutants. Moreover, it is suggested that the proposed residential land use be separated from all the water bodies larger than 1 hectare using a buffer on both sides.

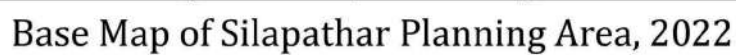
The above-mentioned proposed land use has been shown in the Proposed Land Use, 2041 (see **Figure 20.3**).

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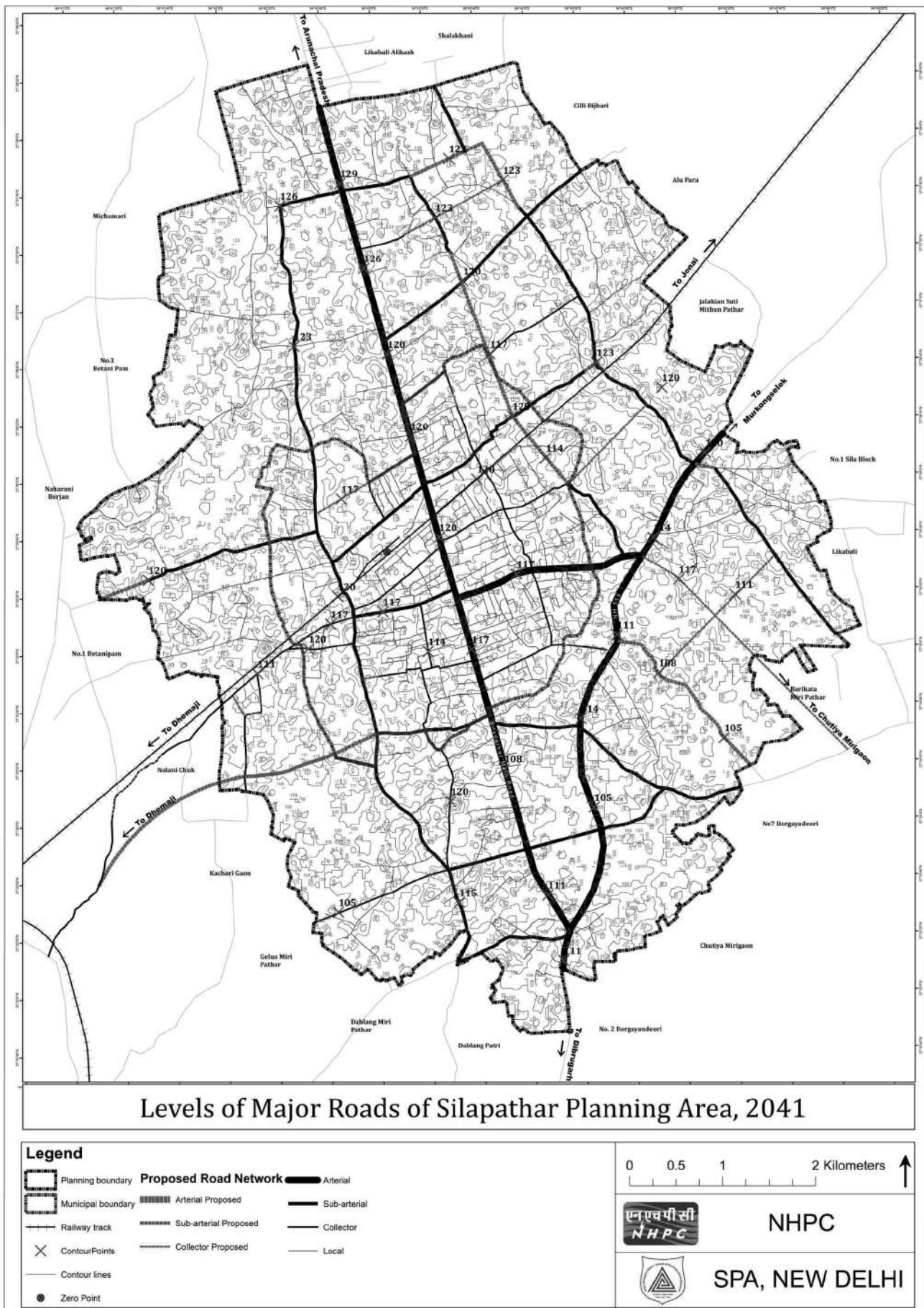
Source: SPA, New Delhi

## REFERENCES

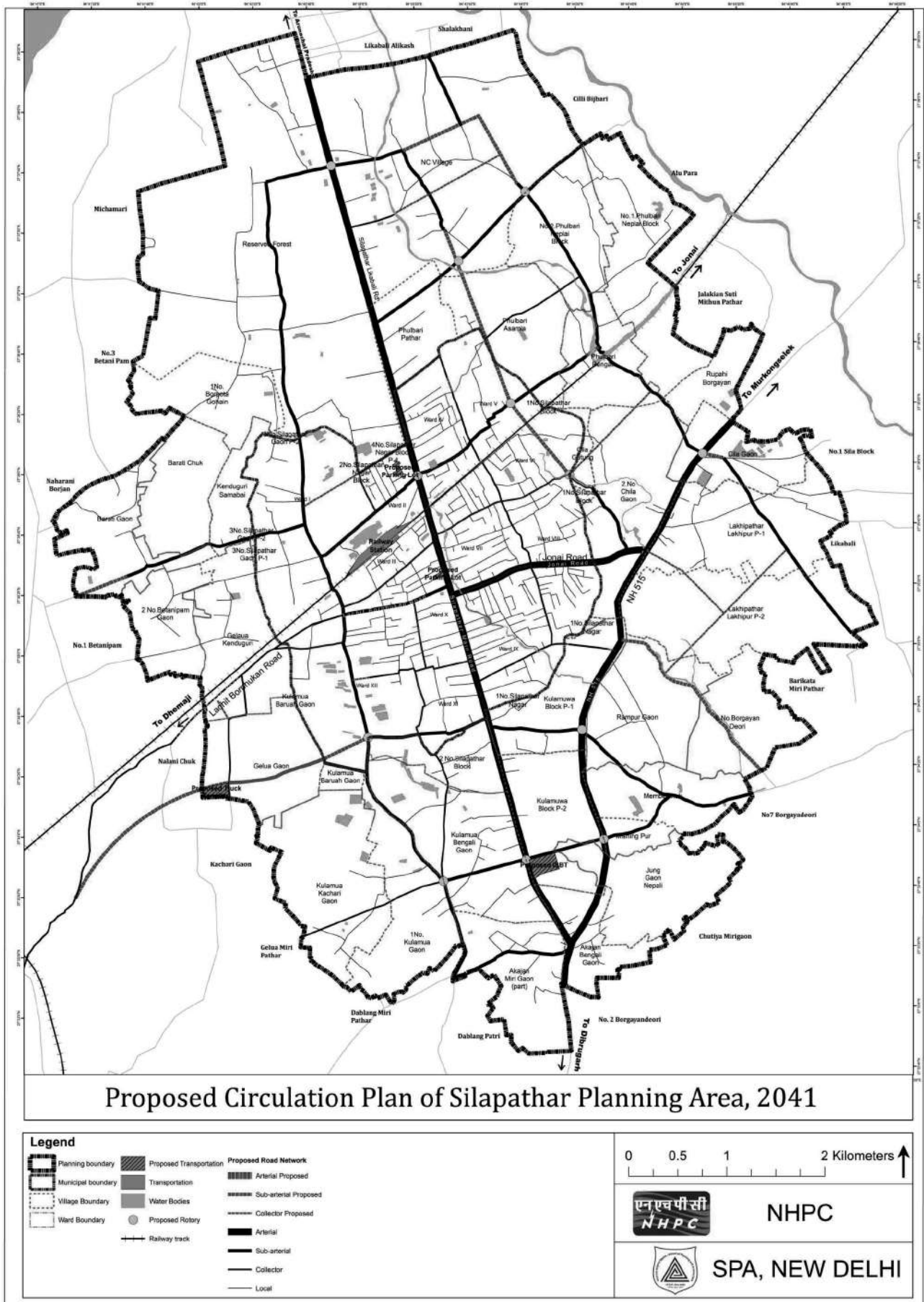
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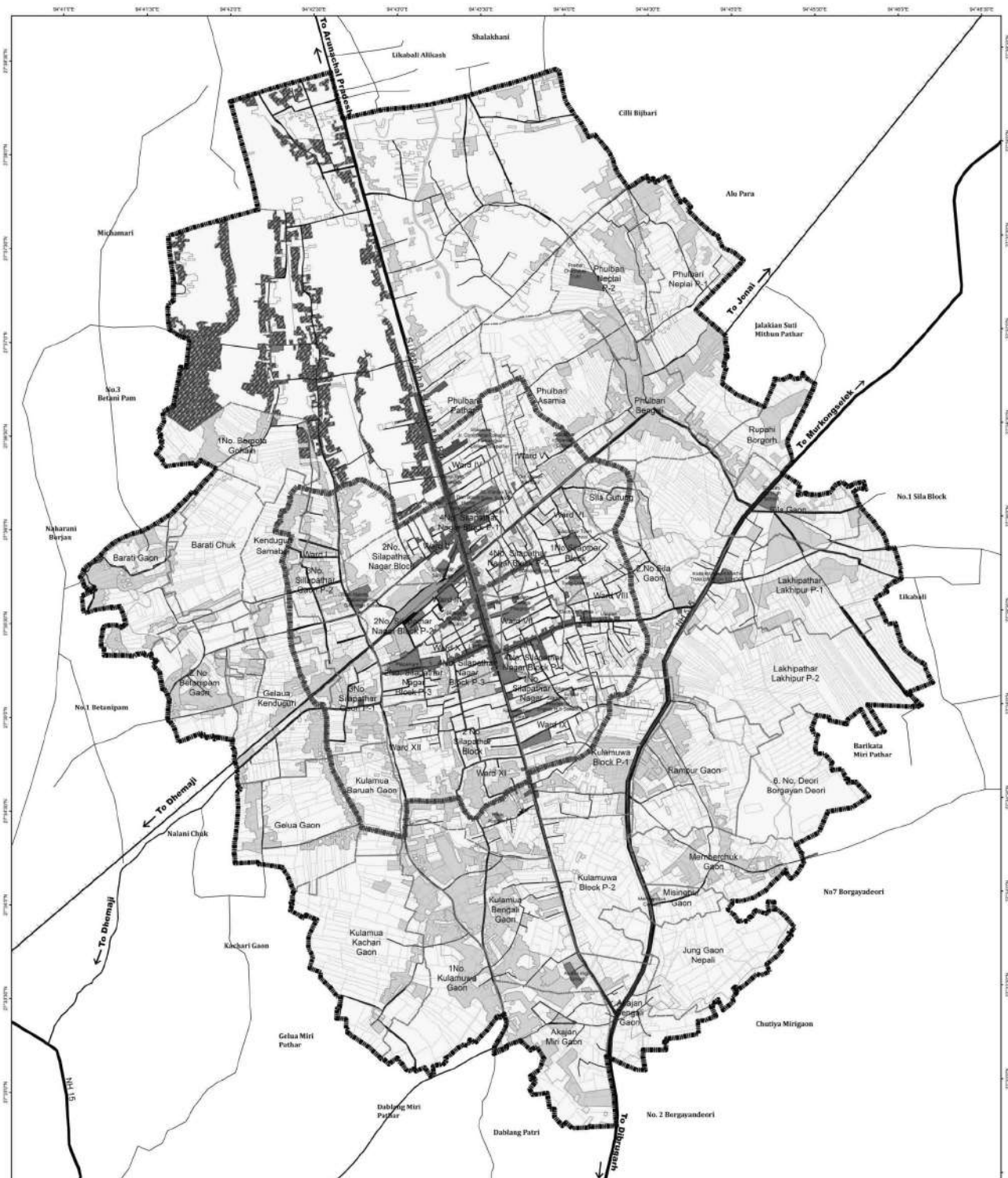












Land Use of Silapathar Planning Area, 2022

## Legend

- Planning Boundary
- Municipal Boundary
- Village Boundaries
- Ward Boundary
- Dag Boundary

## Land Use

- Residential
- Commercial
- Public-semi-public
- Industrial
- Agriculture

- Open Green Spaces
- Recreational
- Reserved Forest
- Roads
- Transportation
- Water Body

Sl. No.	Proposed Land Use	Municipal Area		Planning Area	
		Area (Sq. Km)	Percent of Municipal Area	Area (Sq. Km)	Percent of Planning Area
1	Residential	4.77	45.12	11.44	21.43
2	Commercial	0.37	3.50	0.43	0.81
3	Industry	0.02	0.23	0.02	0.04
4	Public & Semi-Public	0.43	4.03	0.55	1.03
5	Recreational/Play Ground/Green	0.07	0.67	0.06	0.12
6	Roads	0.96	9.09	2.35	4.4
7	Transportation	0.07	0.67	0.07	0.14
8	Developed Area	8.79	83.33	14.94	28
9	Agriculture	2.03	19.15	28.2	52.84
10	Water Body	0.15	1.43	0.06	0.12
11	Open Space/Grassland	1.66	15.69	7.92	14.83
12	Barren Forest	0	0	1.44	2.7
13	Underdeveloped Area	3.88	36.47	38.43	72
Total		10.58	100	53.37	100

0 0.5 1 2 Kilometers



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